Course Specifications
Valid as from the academic year 2017-2018

Physics 1: Mechanics, Vibrations and Waves (I001825)

Course

Lecturers in academic year 2018-2019

Poelman, Dirk
WE04 lecturer-in-charge

Course offerings and teaching methods in academic year 2018-2019

A (semester 1) Dutch
practicum 12.5 h
lecture: plenary 17.5 h
exercises
lecture 36.25 h
guided self-study 6.25 h

Offered in the following programmes in 2018-2019

Bachelor of Science in Bioscience Engineering (main subject Agricultural Sciences) 6 A
Bachelor of Science in Bioscience Engineering (main subject Cell and Gene Biotechnology) 6 A
Bachelor of Science in Bioscience Engineering (main subject Chemistry and Food Technology) 6 A
Bachelor of Science in Bioscience Engineering (main subject Environmental Technology) 6 A
Bachelor of Science in Bioscience Engineering (main subject Land and Forest Management) 6 A
Joint Section Bachelor of Science in Bio-Engineering 6 A

Teaching languages

Dutch

Keywords

Basic physics, mechanics, mechanical vibrations, mechanical waves

Position of the course

Give the students a thorough training in basic physics, oriented both on basic principles and on practical applications. The purpose of the practical exercises is to make the students acquainted with experimental measuring equipment, to learn them to carry out a scientific experiment and to report on it.

Contents

Theory:

Chapter 1: Introduction, measurement and estimation
Chapter 2: Describing motion: Kinematics in one dimension
Chapter 3: Kinematics in two and three dimensions; vectors
Chapter 4: Dynamics: Newton's laws of motion
Chapter 5: Newton's laws: friction, circular motion
Chapter 6: Gravity and Newton's synthesis
Chapter 7: Work and energy
Chapter 8: Conservation of energy
Chapter 9: Linear momentum
Chapter 10: Rotational motion
Chapter 11: General rotation
Chapter 12: Static equilibrium, elasticity and fracture
Chapter 13: Liquids
Chapter 14: Vibrations
Chapter 15: Wave motion

(Course approved)
Chapter 16: Sound

**Exercises:**
Guided problem solving, intimately connected to the theory lessons.

**Practical exercises:**
Set of 3 physical experiments (not necessarily related to the course content), conducted individually or per 2 students. A single experiment takes one afternoon.

**Initial competences**
Ability to apply basic mathematical techniques for mathematical derivations.

**Final competences**
1. Have the ability to recognise and analyse forces in simple mechanical systems
2. Have the ability to apply Newton's laws for translations and rotations

3. Have the ability to describe and analyse mechanical vibrations
4. Have the ability to define the basic concepts of Newtonian mechanics

5. Be able to set up and conduct a simple physical experiment

6. Have insight in orders of magnitude of physical quantities and measurement errors

**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, practicum, lecture: plenary exercises

**Learning materials and price**
- D. C. Giancoli, Natuurkunde, deel 1, 4e editie: Mechanica en thermodynamica
  (English version available): 75 Euro
- The powerpoint presentations, used in theory lessons, are made available to the students in electronic form.
- Course notes for the practical exercises, available via Minerva.
- Formularium, made available through Minerva.

**References**
See teaching and learning material

**Course content-related study coaching**
Guided problem solving, intimately connected to the theory lessons. Occasion for questions before and after theory lessons and electronically (Minerva).

**Evaluation methods**
end-of-term evaluation and continuous assessment

**Examination methods in case of periodic evaluation during the first examination period**
Written examination with multiple choice questions

**Examination methods in case of periodic evaluation during the second examination period**
Written examination with multiple choice questions

**Examination methods in case of permanent evaluation**
Participation, assignment

**Possibilities of retake in case of permanent evaluation**
Examination during the second examination period is not possible

**Extra information on the examination methods**
Written exam with the possibility to use a (fixed) formularium; multiple-choice questions with standard setting.
Permanent evaluation: evaluation of lab project reports

**Calculation of the examination mark**
Practical exercises (permanent evaluation): 15% of the total mark; written exam: 85%

(Approved)
of the total mark. Students who eschew period aligned and/or non-period aligned evaluations for this course unit may be failed by the examinator.