

Course Specifications

Valid in the academic year 2018-2019

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

Credits 6.0 Study time 180 h Contact hrs 52.5 h

Course offerings and teaching methods in academic year 2018-2019

A (semester 1)	Dutch	seminar: coached	22.5 h
		exercises	
		lecture	30.0 h

Lecturers in academic year 2018-2019

Boone, Matthieu WE05 lecturer-in-charge

Offered in the following programmes in 2018-2019

Bachelor of Science in Physics and Astronomy	crdts	offering
	6	A

Teaching languages

Dutch

Keywords

Mechanics, general physics

Position of the course

This course is the first part of the general physics, the latter consisting of four parts: Mechanics, Waves and Optics, Electricity and Magnetism, and Thermal Physics. The objective of this first part is to derive laws and principles of the Newtonian Mechanics from observed phenomena, via rigorous mathematical formulation and supported by numerous examples and problems. The kinematics and dynamics are further treated in a more modern and general way by relativistic principles. The importance of this course resides in initiating the student in building up a logical development of the physics with the implementation of mathematical formalisms. The global basic physics also aims at stimulating the student to physical thinking.

Contents

Preparatory notions (units and dimensions, vector calculation) - Kinematics (motion in 1, 2 and 3 dimensions, circular motion, relative motion) - Statics en Dynamics (interactions, linear momentum and force, laws of Newton, statical and dynamical applications) - Work and energy (work, kinetic en potential energy, work-energy theorem, energy diagrams, energy conservation) - Systems of particles (collisions in 1 and 2 dimensions, center of mass, angular momentum and torque) - Mechanics of rigid bodies (volume, density, angular momentum and torque of rigid bodies, conservation of angular momentum, rotational work and energy, moment of inertia calculations) - Gravitation (law of gravitation and force, laws of Kepler, gravitational energy, planet and satellite movements, gravitational potential) - Mechanics of deformable bodies and fluids (elasticity, strain stress, pressure, hydrostatics, flow and hydrodynamics) - Relativistic kinematics and dynamics (relativity principle and constancy of speed of light, moving objects, moving clocks, relativistic momentum, mass and energy).

Initial competences

None

Final competences

- 1 This course enables the student to follow and understand the following courses in general physics in which, knowledge, insight and ability for application are the main issues. It also forms the basis for the more fundamental physics courses with more experimental background (Subatomic Physics, Solid State Physics, Atomic and Molecular Physics and Astrophysics) on one hand and with more theoretical background (Theoretical Mechanics, Quantum mechanics and Advanced Relativity)

on the other.

- 2 The global course of general physics should provide a large experience in physical thinking and analysing.

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, seminar: coached exercises

Learning materials and price

D.C. Giancoli - Natuurkunde - Deel 1 (Mechanica en Thermodynamica); Price: 70 €

References

M. Alonso & D.J. Finn: Fundamentele natuurkunde I Mechanica, Delta Press (1989)

Course content-related study coaching

The knowledge and the ability for application of mechanics can be tested via de interaction in the workshops. The opportunity for individual consultation with the teaching staff member or assistant is possible by electronic way (e-mail) or by oral contact after each class or workshop or by appointment. Interaction with teaching member or among the students mutually is available via an electronic study environment (<http://minerva.UGent.be>)

Evaluation methods

end-of-term evaluation

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

Written examination with open questions, open book examination

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

Written examination with open questions, open book examination

Examination methods in case of permanent evaluation

Possibilities of retake in case of permanent evaluation

not applicable

Calculation of the examination mark

Theory: 50%

Exercises: 50%

Small deviations from the exact 50-50 division are possible, depending on the difficulty of the questions.