GHENT UNIVERSITY

Course Specifications

Valid as from the academic year 2024-2025

Mechanics (C000857)

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

Credits 6.0 **Study time 180 h**

Course offerings and teaching methods in academic year 2024-2025

A (semester 1)	Dutch	Gent	lecture
			seminar

Lecturers in academic year 2024-2025

Boone, Matthieu	WE05	lecturer-in-charge

Offered in the following programmes in 2024-2025	**crdts**	**offering**
Bachelor of Science in Physics and Astronomy	6	A
Micro-credential Mechanics	6	A

Teaching languages

Dutch

Keywords

Mechanics, general physics

Position of the course

This course unit belongs to the learning pathway "General physics" in the Bachelor program Physics and Astronomy.
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) - Relativististic 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,

Quantummechanics and Advanced Relativity) on the other.
2 Mastering physical thinking and analysing.
3 Reducing complex problems to their (physical) essence and solve them.
4 Evaluating measurement results and solutions to problems critically.

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

Seminar, Lecture

Study material

Type: Handbook

Name: Giancoli - Natuurkunde 2
Indicative price: € 90
Optional: yes
Language : Dutch
Author : Douglas Giancoli
ISBN : 978-9-04303-872-0
Alternative : handouts
Oldest Usable Edition : 3rd edition
Online Available : Yes
Usability and Lifetime within the Course Unit : one-time

Type: Handbook

Name: Giancoli - Natuurkunde 1
Indicative price: € 90
Optional: no
Language : Dutch
Author : Douglas Giancoli
ISBN : 978-1-80006-765-3
Number of Pages : 550
Alternative : handouts (not ideal)
Oldest Usable Edition : 3rd edition
Online Available : No
Usability and Lifetime within the Course Unit : intensive

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 the 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://ufora.UGent.be)

Assessment moments

end-of-term assessment

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

Written assessment with multiple-choice questions, Written assessment with open-ended questions

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

Written assessment with multiple-choice questions, Written assessment with open-ended questions

Examination methods in case of permanent assessment

Possibilities of retake in case of permanent assessment

not applicable

Extra information on the examination methods

Written exam with closed book part and open book part

Calculation of the examination mark

The closed book and open book part each count for approx. 50% of the score. Small deviations from the exact 50-50 division are possible.