Course Specifications

Valid as from the academic year 2019-2020

Physics 1 and 2: Mechanics, Vibration, Waves and Thermodynamics (O000134)

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

Credits	10.0	Study time	300 h	Contact hrs	120.0 h

Course offerings and teaching methods in academic year 2019-2020

A (year)	English	seminar: coached exercises	60.0 h
		lecture	60.0 h

Lecturers in academic year 2019-2020

Kumar, Surender	KR01	lecturer-in-charge

Offered in the following programmes in 2019-2020	crdts	offering
Bachelor of Science in Environmental Technology	10	A
Bachelor of Science in Food Technology	10	A
Bachelor of Science in Molecular Biotechnology	10	A
Joint Section Bachelor of Science in Environmental Technology, Food Technology and Molecular Biotechnology	10	A

Teaching languages

English

Keywords

Newtonian Mechanics, Waves, Vibrations, Properties of materials, Thermodynamics

Position of the course

Give the students a thorough training in basic physics, with a focus on both basic principles and practical applications. The purpose of the course is
- to make the students familiar with the practical applications of mechanics in everyday life,
- to establish an understanding of the various states of matter,
- to gain a working understanding of both physical and chemical thermodynamics,
- to learn with respect to physical aspects how to calculate the energy transfer of processes,

Contents

1. Introduction, measurement
2. Describing motion: Kinematics in one dimension
3. Kinematics in two and three dimensions; vectors
4. Dynamics: Newton's laws of motion
5. Newton's laws: friction, circular motion
6. Gravity and Newton's synthesis
7. Work and energy
8. Conservation of energy
9. Linear momentum
10. Rotational motion
11. Angular momentum; General rotation
12. Static equilibrium; Elasticity and fracture
13. Fluids
14. Oscillations
15. Wave motion
16. Sound
17. Temperature, thermal expansion and the ideal gas law
18. Kinetic theory of gases
19. Heat and the first law of thermodynamics

20. Second law of thermodynamics

Initial competences

Secondary school knowledge of physics and mathematics

Final competences

1. The student must have acquired the ability to independently recognize and analyze forces in simple mechanical systems
2. apply Newton's laws for linear and rotational motions.
3. recognize and apply fundamental conservation laws.
4. describe and analyze mechanical vibrations and wave motion in general classical systems.
5. describe and analyze thermodynamic processes and properties of materials.

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

Extra information on the teaching methods

Lecture: 60 hours, coached exercises: 60 hours

Learning materials and price

D. C. Giancoli (2009), Physics for scientists & engineers with modern physics.

References

D. C. Giancoli (2009), Physics for scientists & engineers with modern physics.

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

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

Written examination

Examination methods in case of permanent evaluation

Written examination

Possibilities of retake in case of permanent evaluation

examination during the second examination period is not possible

Extra information on the examination methods

End-of-term evaluation and continuous assessment

Calculation of the examination mark

Written examination with open questions and with multiple choice questions = 80%
Non continuous assessment test = 20%