Linnæus University

Course syllabus

Faculty of Technology
Department of Physics and Electrical Engineering

4FY510 Statistisk fysik I, 7,5 högskolepoäng
Statistical Physics I, 7.5 credits

Main field of study
Physics

Subject Group
Physics

Level of classification
Second Level

Progression
A1N

Date of Ratification
Approved by Faculty of Technology 2014-10-03
The course syllabus is valid from autumn semester 2015

Prerequisites
Physics 90 credits, mathematics 45 credits. An introduction course in quantum mechanics. An introduction course in thermodynamics and probability theory or equivalent knowledge. English B or equivalent.

Objectives

After taking this course the student is expected to have acquired:

- a knowledge of the theoretical basis of statistical mechanics, and the understanding of its role as a microscopic description of the fundamental thermodynamics laws
- a knowledge of the phenomenology of phase transitions based on thermodynamics and Landau theory
- an introduction to quantum statistical mechanics
- the skill of using theoretical and mathematical methods to build models and solve problems in statistical mechanics.

Content

This course is an introduction of the foundations of statistical mechanics.

1. Review of the laws of thermodynamics
2. Thermodynamic description of phase transitions. Landau theory for the simplest para-ferromagnetic transitions
3. Gibbs ensembles in classical and quantum equilibrium in statistical mechanics
4. Existence of thermodynamic limit
5. Cluster and virial expansion
6. Ideal Fermi and Bose gases

Type of Instruction

The teaching consists of lectures and tutorials.

Students can also register for the "distance" version of the course and follow the course via the internet. IT support and technical information: Email and web connection. Real-time and recorded lectures on course homepage.

Examination

The course is assessed with the grades A, B, C, D, E, Fx or F.
The grade A constitutes the highest grade on the scale and the remaining grades follow in descending order where the grade E is the lowest grade on the scale that will result in a pass. The grade F means that the student's performance is assessed as fail (i.e. received the grade F).

Assessment of student performance is made through written test and/or oral examinations and/or presentation of mandatory assignments.

A second examination will be offered within six weeks under the regular semester periods. The number of examinations is limited to five times.

Course Evaluation

A course evaluation will be carried out at the end of the course in accordance with the guidelines of the University. The result of the course evaluation will be filed at the department.

Credit Overlap

The course cannot be included in a degree along with the following course/courses of which the content fully, or partly, corresponds to the content of this course:4FY810 Statistical Physics I, 7.5 credits

Other

Grade criteria for the A–F scale are communicated to the student through a special document. The student is to be informed about the grade criteria for the course by the start of the course at the latest.

Required Reading and Additional Study Material
Reference literature

1. Huang, K., Statistical Mechanics, Second edition (1987) John Wiley
2. Supplementary material provided by the Teacher