COURSE DETAIL

STATISTICAL MECHANICS AND FOUNDATIONS OF QUANTUM MECHANICS

Country
Netherlands

Host Institution
Utrecht University – University College Utrecht

Program(s)
University College Utrecht

UCEAP Course Level
Upper Division

UCEAP Subject Area(s)
Physics

UCEAP Course Number
135

UCEAP Course Suffix

UCEAP Official Title
STATISTICAL MECHANICS AND FOUNDATIONS OF QUANTUM MECHANICS

UCEAP Transcript Title
QUANTUM MECHANICS

UCEAP Quarter Units
6.00

UCEAP Semester Units

4.00

Course Description
In this course students learn how to formulate the statistical description of a gas in thermodynamic equilibrium as a system of many weakly interacting particles. From this formalism, when applied to simple systems, students derive some well-known empirical thermodynamic laws relating quantities such as temperature and pressure, known as equation of states and Maxwell relations. The course introduces the concept of entropy and its relation to the famous second principle of thermodynamics. Entropy is discussed from its original introduction in the study of the Carnot cycle to its probabilistic definition introduced half a century later by Boltzmann. The last part of the course introduces quantum mechanics starting from its postulates and shown how to arrive at the well-known Heisenberg uncertainty relations. This approach is used to study simple systems. The course also discusses why the quantum mechanical description of the physical world provides a more well defined way of applying the formalism of statistical mechanics to nature. Prerequisites for this course are calculus, linear algebra, and relativistic and classical physics.

Language(s) of Instruction
English

Host Institution Course Number
UCSCIPHY25

Host Institution Course Title
STATISTICAL MECHANICS AND FOUNDATIONS OF QUANTUM MECHANICS

Host Institution Course Details

Host Institution Campus
Sciences

Host Institution Faculty

Host Institution Degree

Host Institution Department
Physics

Course Last Reviewed

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