Graduate Course Description

Spring 1998

Course Title: Statistical Mechanics

Course and unique no.: M393C (52395)

Instructor: Hans Koch **Hour:** TTH 11:00–12:30 RLM 10.176

Brief description: This course is an introduction to the basic concepts of Statistical Mechanics, and to the techniques used in the rigorous analysis of concrete models. The models considered describe the behavior of large systems of interacting particles in thermodynamic equilibrium. But many of the the concepts and techniques used to describe these models have been successful in other areas as well, such as quantum field theory and dynamical systems.

Among the topics that will be covered are: Thermodynamic behavior, ensembles, concrete models; Thermodynamic limit, correlation inequalities, cluster expansion (high temperature), contour expansions (low temperature); Equilibrium states, variational equations, phase transitions, Lee-Yang theorem, symmetries, Mermin-Wagner theorem; Critical phenomena, universality, renormalization, hierarchical models; Spin glasses, neural networks (?)

Prerequisites: Some familiarity with Probability Theory.

Textbook(s): None

Consent of instructor required: No