

**School of Mathematics**

**Module MA3444 — Statistical physics II**  
( JS Theoretical Physics )

2010-11

**Lecturer:** Dr. Stefan Sint

**Requirements/prerequisites:** prerequisite: MA3443

**Duration:** Hilary term, 11 weeks

**Number of lectures per week:** 3 lectures including tutorials per week

**Assessment:**

**ECTS credits:** 5

**End-of-year Examination:** This module will be examined jointly with MA3443 in a 3-hour examination in Trinity term, except that those taking just one of the two modules will have a 2 hour examination. However there will be separate results for MA3444 and MA3443.

**Description:**

**Learning Outcomes:** On successful completion of this module, students will be able to:

- explain the difference between fermions and bosons and work out the consequences for  $N$ -particle systems at low temperatures;
- make contact with the classical regime at high temperatures and/or low particle densities;
- apply the formalism of statistical physics to systems without particle number conservation (e.g. photons, phonons);
- apply the formalism of quantum statistical physics to simple model systems;
- apply the formalism of thermodynamics to magnetic/spin systems;
- do a mean field analysis of spin systems;
- solve the 1-dimensional Ising model, and show familiarity with Peierl's argument in 2 dimensions.

April 21, 2011