Statistical Physics 2 schedule, 2025-26 / Fall

Week	Dates	Topics	Dates2	Topics2
	Tue 16:00-17:30	**Tuesday 16:00-17:30**	**Fri 08:30-10:00**	**Friday 08:30-10:00**
1	September 9, 2025	**Part 1: Phase transitions** L1: Ferromagnetic transition (revision); conditional free energy, Ginzburg-Landau theory	September 12, 2025	T1: Mean field (from free energy): ferro Ising, antiferro Ising, Heisenberg
2	September 16, 2025	SPORTS DAY	September 19, 2025	T2: 2-spin cluster, crit. exponents in Landau theory, scaling functions in mean field theory, tricritical point
3	September 23, 2025	L2: Scaling functions, exponents and connection between critical exponents. Correlations, linear response	September 26, 2025	L3: Scaling and renormalization group
4	September 30, 2025	L4: Superfluidity I: basic phenomena, Tisza theory, Gross-Pitaevskii theory	October 3, 2025	**Test 1** (theory + excercises): Phase transitions
5	October 7, 2025	L5: Superfluidity II: healing length, vortices, rotons, explanation of superfluidity, time dependent Gross-Pitaevskii equation	October 10, 2025	**Part 2: Quantum Stat. Phys.: Density operator** L6: Density operator coupled spins, density operators, mixed and pure states
6	October 14, 2025	T3: Density operator	October 17, 2025	L7: General structure of density matrix Neumann equation (spin in external field) Time averages and equilibrium structure of DM
7	October 21, 2025	T4: Neumann equation, Lindblad equation(?), Principle of maximal entropy	October 24, 2025	HOLIDAY
8	October 28, 2025	**Part 3: Quantum Stat. Phys.: Linear response, noise** L9: Generalized dynamical susceptibility, Linear response theory, Kubo formula	October 31, 2025	
9	November 4, 2025	L11: FDT, classical limit, Onsager's regression hypothesis, Johnson noise of resistive circuits	November 7, 2025	**Test 2** (theory + exercises): Density operator, max. ent. principle
10	November 11, 2025	L10: Time dependent correlations, classical noise, quantum noise	November 14, 2025	consultation? extra tutorial on correlations?
11	November 18, 2025	**Test 3** (theory only): Linear response, Kubo formula, noise	November 21, 2025	**Part 4: Intro to Nonequilibrium Stat. Phys.** L12: H-theorem and relaxation to equilibrium Monte Carlo simulations: Detailed balance, MC sampling, Metropolis algorithm, simulated annealing
12	November 25, 2025	L13: Brownian motion, diffusion and Langevin equation	November 28, 2025	University Open Day
13	December 2, 2025	L14: Fokker-Planck equation, velocity relaxation and generalized diffusion equation, Boltzmann equation?	December 5, 2025	T5: Diffusion equation
14	December 9, 2025	Boltzmann equation + consultation?	December 12, 2025	**Test 4** (theory + exercises): Langevin eq., diffusion eq.
15	December 16, 2025		December 19, 2025	**Test Retake** (2 out of 7)