Physics 4311: Thermal Physics (Thomas Vojta)

The schedule is tentative and may be adjusted depending on the progress of the class.

1. **Introduction**
   - 1.1 What is thermal physics?
   - 1.2 Physical description of large systems (Blundell + Blundell chapter 1)
   - 1.3 Probability (chapter 3)
   - 1.4 Heat (chapter 2)
   - 1.5 Temperature and the Boltzmann factor (chapter 4)
2. **Kinetic gas theory**
   - 2.1 Maxwell-Boltzmann distribution (chapter 5)
   - 2.2 Ideal gas (chapter 6)
   - 2.3 Effusion (chapter 7)
   - 2.4 Collisions (chapter 8)
3. **Thermodynamics**
   - 3.1 First law (chapters 11, 12)
   - 3.2 Second law (chapters 13, 14)
   - 3.3 Thermodynamic potentials (chapter 16)
   - 3.4 Rods, bubbles, and magnets (chapter 17)
   - 3.5 Third law (chapter 18)
4. **Statistical mechanics**
   - 4.1 Partition function (chapter 20)
   - 4.2 Statistical mechanics of the ideal gas (chapter 21)
   - 4.3 Equipartition theorem (chapter 19)
   - 4.4 Chemical potential (chapter 22)
5. **Beyond the ideal gas**
   - 5.1 Black-body radiation (chapter 23)
   - 5.2 Phonons (chapter 24)
   - 5.3 Phase transitions (chapter 28)
   - 5.4 Bose-Einstein and Fermi-Dirac distributions (chapter 29)
   - 5.5 Quantum gases and condensation (chapter 30)