

Tue	12.4	Laws of thermodynamics: first law and different kinds of work (*, 1.1)	L1
Thu	14.4	postulates of Kelvin and Clausius, Carnot engine, temperature (*, 1.2 & 1.3)	L2
Fr	15.4	-- holiday -- Karfreitag	-
Tue	19.4	second law and entropy (*, 1.4)	L3
Thu	21.4	the mathematics of thermodynamics (*, appendix A)	L4
Fr	22.4	no recitation	-
Tue	26.4	Thermodynamic functions: internal energy and enthalpy (*, 2.1)	L5
Thu	28.4	free energy and free enthalpy (*, 2.3); extensive and intensive quantities (*, 2.4)	L6
Fr	29.4	1. recitation	R
Tue	3.5	Equilibrium and stability: application of the principle of maximum entropy (*, 3.1)	L7
Thu	5.5	chemical potential, chemical equilibrium (*, 3.2)	L8
Fr	6.5	2. recitation	R
Tue	10.5	Simple phase diagrams: phase rule, van der Waals theory (*, 3.1 / 4.1)	L9
Thu	12.5	Ensemble theory & microscopic interactions: canonical ensemble and its generalization (*, chap 5; **, 2.2 / 2.3)	L10
Fr	13.5	3. recitation	R
Tue	17.5	Systems without direct interaction: gases of photons and phonons (**, 3.1 / 3.2)	L11
Thu	19.5	Bose-condensation (**, 2.5)	L12
Fr	20.5	4. recitation	R
Tue	24.5	free electron gas (**, 2.5)	L13
Thu	26.5	-- holiday --	-
Fr	27.5	5. recitation	R
Tue	31.5	Classical partition functions: atomic and molecular gases (**, 2.1 / 3.4)	L14
Thu	2.6	virial expansion, generalized equipartition theorem (**, 2.1)	L15
Fr	3.6	6. recitation	R
Tue	7.6	-- break (Pfingsferien) --	-
Thu	9.6	-- break (Pfingsferien) --	-
Fr	10.6	-- break (Pfingsferien) --	-
Tue	14.6	Fluctuation theory: energy fluctuations (*, 5.16/5.17), Einstein-fluctuation theory (**, 5.1)	L16
Thu	16.6	-- holiday -- Fronleichnam	-
Fr	17.6	7. recitation	R
Tue	21.6	example: thermally fluctuating membrane (**, 5.2)	L17
Thu	23.6	Critical phenomena (**, 6.1 – 6.7): Ginsburg-Landau mean-field theory, spontaneous symmetry breaking	L18
Fr	24.6	8. recitation	R
Tue	28.6	critical fluctuations, scaling hypothesis	L19
Thu	30.6	renormalization group ideas	L20
Fr	1.7	9. recitation	R
Tue	5.7	Selected topic – computer simulation: Metropolis Monte Carlo (**, chap. 7)	L21
Thu	7.7	Selected topics – polymer physics: rubber elasticity (*, 5.1 2 nd ed.)	L22
Fr	8.7	10. recitation	R
Tue	12.7	the transfer matrix method applied to polymers (**, 8.1)	L23
Thu	14.7	Selected topic – cosmology: equation of state of the universe (***, chap. 9)	L24

Literature:

(*) R. Hentschke, Thermodynamics, Springer, 2014 (English)

(**) R. Hentschke, Statistische Mechanik, Wiley-VCH, 2004 (German)

(***) R. Hentschke and Ch. Hölbling, A Short Course in General Relativity and Cosmology, Springer, 2020 (English)