Suggested Reading

General textbooks on physical chemistry, such as provide some overview of the most important concepts of statistical thermodynamics as well as some of the key formulas, but they are not quite on the level of this advanced course. If you already own these books, it might still be useful to read what they write on the topic. If you have the choice, Engel/Reid is better on this topic than Atkins . The best introduction in a general physical chemistry textbook can be found in the German book by Wedler and Freund .

A rather good and modern introduction at an advanced level has been published in English language by Swendsen . Swendsen introduces statistical thermodynamics together with phenomenological thermodynamics and covers more examples than we can treat in this course. He does not introduce some concepts that are widely used in the field, because he dislikes them. In this course we do introduce these concepts and discuss the problems associated with them.

A modern German-language introduction is the one by Schwabl , which caters more to the physicist than to the physical chemist. Schwabl is stronger on phase transitions and dynamic phenomena, but probably harder to read than Swendsen, even if German is your native language. For Chapter , but only for this Chapter, Maczek's book from the Oxford Chemistry Primers series can be quite useful. Several topics that are not or only superficially covered in my lecture notes are treated in the notes by Cohen from Ben Gurion University , which are strongly focused on quantum applications. Finally, I want to mention Penrose's book , which is certainly not an introductory textbook and may be most appealing to the strongly mathematically or philosophically inclined. If you look for guidance on *applying* statistical thermodynamics to real systems this book is certainly deficient, but from an epistemological point of view it is probably the best one.

For many of the central concepts I have looked up (English) Wikipedia articles and have found that these articles are, on average, of rather good quality. They do differ quite strongly from each other in style and notation. When using only Wikipedia or other internet resources it is difficult to fit the pieces of information together. If, on the other hand, you already do have a basic level of understanding, but some difficulties with a particular concept, such sources may provide just the missing piece of information. The NIST guide for computing thermodynamical state functions from the results of *ab initio* computations is a particularly good example for a useful internet resource .