

## FIZ310E Statistical Physics and Thermodynamics

Spring 2020-2021 ... Online semester ☹

**Very important note-1:** Please do not follow the classes on your cellphone screen. It is simply too small to see anything. If you have infrastructure problems, contact the authorities.

**Very important note-2:** Please be patient especially during the first 4 weeks of this course. Read the book and do this several times. Note that, this is not a math or formula-based course!!! Remember: Concepts are more important in physics.

***Some other important stuff:***

**Contact:** [oguzhan.gurlu@gmail.com](mailto:oguzhan.gurlu@gmail.com)

Please use the following subject in your emails: "FIZ310E \_2021"

\*\*\* Any other form of communication regarding this course (like: wrong email address) may cause miscommunication.

***Grading:***

Homework: 0 %

Quiz (5): 30%

Oral exam (1): 20%

Midterms (2): 10% + %10

Final: 30%

*(Midterms will be organized for evenings and oral exam will take place during the last week of the course.)*

***VF condition: 50% (of the complete 100%)***

*(So, you need to collect 50 points out of 70 points during the semester)*

**Contents:**

The following concepts will be discussed during the 14 weeks of the course:

- General properties of macroscopic systems, equilibrium fluctuations, irreversibility, heat and temperature.
- Fundamental probability concepts, ensemble, binomial distributions, average values, dispersion.
- Continuous probability distributions.

- Description of the state of a system, degree of freedom, statistical postulates, accessibly states, density of states.
- Interaction between systems, first law of thermodynamics.
- Thermal interaction, absolute temperature, zeroth law.
- Para magnetism.
- Work, heat and energy.
- Entropy.
- Intensive and extensive parameters.
- Canonical distribution, Maxwell-Boltzmann distribution.
- Equipartition theorem.
- Heat capacity.
- General thermodynamic interaction, equilibrium between phases.
- Fundamental statements of thermodynamics.
- Engines.
- Thermal conductivity.

**Sources** (Since the semester will be online, you will be mainly responsible for reading a single book (item-1), I will try to stick to this text):

- 1) Statistical Physics (Berkeley Physics Course Volume 5), F. Reif
- 2) Extensive: Fundamentals of Statistical and Thermal Physics, F. Reif
- 3) Statistical Mechanics, R.K. Pathria
- 4) Thermal Physics, C. Kittel and H. Kroemer

**A note on cheating:** Zero tolerance policy. Please make sure that you can answer the questions during the oral exam, if you have given correct answers for them in your other exam/quiz papers.