A warm welcome to all of you to my course on thermal physics, which is a 6 week course. This is the first handout for this course, and some details regarding the course content, functioning of the course and the evaluation criteria are summarized here. You are requested to read this document carefully as they will be followed during the course.

Instructor:
Koushik Pal — Office: Old SAC, Block C, Office No 106, ✉: koushik@iitk.ac.in, ☎: 2435

Classes: on T(T105)Th(T110)F(T110) 11:00-12:00 and Tutorial on W(T110) 11:00-12:00

Office hour: by appointment through email (in my office).

Books:

- H. B. Callen, **Thermodynamics and an introduction to Thermostatics** (Wiley)

- M. W. Zemansky and Richard H. Dittman, **Heat and Thermodynamics** (Tata McGraw-Hill Education)

- F. Reif, **Fundamentals of Statistical and Thermal Physics** (McGraw-Hill Book Company)

Course description:

- Macroscopic thermodynamic state, basic postulates, heat and work, energy and entropy representation, equilibrium state and laws of thermodynamics (~ 3 lec)

- Equation of state, Euler equation, Gibbs-Duhem relations, ideal gas, ideal vdW fluid; ideal magnetic systems (~ 4 lec)

- Quasi-static and reversible processes, maximum work theorem, engine and refrigerator efficiencies, Carnot cycle (~ 4 lec)

- Legendre transformations and different thermodynamic potentials (enthalpy, Helmholtz potential, Gibbs potential), Joule-Thomson process (~ 3 lec)

- Stability of thermodynamic systems and phase transitions (~ 3 lec)

- Kinetic theory of gases, Maxwell velocity distribution, viscosity, thermal conductivity and diffusion (~ 3 lec)

Grading:

- There will be 2 quizes for this course which will be announced few days in advance. These will carry 40% of the total weight for this course.

- There will be an exam during the midsem exam time slot. This will have 60% of the total weight for this course.

- Practice problems will be given each week, which, however, will not be graded.

- Attending the classes and the exam is compulsory for passing this course.