1. ***Goals and structure***
   Geometrical phenomena (mostly on discrete lattices) will be used to understand concepts of statistical mechanics, phase transitions, universality and scale-invariance. The course consists of guided reading and material presentation by the students. General outline can be seen from the selection of references/books below. However, the level of detail in each specific subject will be determined by the students.

2. ***Books***:

   (a) **Percolation:**

      i. D. Stauffer and A. Aharony, *Introduction to Percolation Theory*, Taylor & Francis, London, 1992.

      ii. B. Ballóbas and O. Riordan, *Percolation*, Cambridge U. Press, 2006.

      iii. G. Grimmett, *Percolation*, Springer, NY, 1989.

      iv. S. Kirkpatrick, *Percolation and conduction*, Rev. Mod. Phys. **45**, 574 (1973).

   (b) **Random walks:**

      i. J. Rudnick and G. Gaspari, *Elements of the Random Walk*, Cambridge U. Press, 2004.

      ii. S. Redner, *A Guide to First-Passage Processes*, Cambridge U. Press, 2001.

      iii. B. D. Hughes, *Random Walks and Random Environments*, Vol. 1: Random Walks, Oxford Science, 2002.

   (c) **Fractals:**

      i. B. B. Mandelbrot, *The Fractal Geometry of Nature*, Freeman, NY 1983.

      ii. *Fractals in Physics*, ed. A. Aharony & J. Feder, Proc. Int. Conf. honoring B. Mandelbrot (Physica D **38**), 1989.