

Nonequilibrium physics with interdisciplinary applications (T) - Nonequilibrium Degree - M.Sc. in Physics (PO von 2014)

<i>Module</i>	Elective Advanced Lectures: BCGS Courses
<i>Module No.</i>	physics70d

<i>Course</i>	Nonequilibrium physics with interdisciplinary applications (T)
<i>Course No.</i>	Nonequilibrium

Category	Type	Language	Teaching hours	CP	Semester
Elective	Lecture with exercises	English	2+1	4	ST

Requirements for Participation:

Preparation: Statistical mechanics

Form of Testing and Examination: Oral examination or term paper

Length of Course: 1 semester

Aims of the Course: Acquaintance with basic concepts of nonequilibrium physics; ability to apply the basic methods for the investigation of nonequilibrium problems; application of physics-based models to interdisciplinary problems.

Contents of the Course:

Principles of nonequilibrium physics

Stochastic systems and their description (master equation, Fokker-Planck equation,..)

Analytical and numerical methods

Nonequilibrium phase transitions

Applications to traffic, pedestrian dynamics, economic systems, biology, pattern formation,..

Recommended Literature:

A. Schadschneider, D. Chowdhury, K. Nishinari: Stochastic Transport in Complex Systems (Elsevier, 2010)

P.L. Krapivsky, S. Redner, E. Ben-Naim: A Kinetic View of Statistical Physics (Cambridge University Press, 2010)

V. Privman (Ed.): Nonequilibrium Statistical Mechanics in One Dimension (Cambridge University Press, 1997)

N.G.Van Kampen: Stochastic Processes in Physics and Chemistry (Elsevier, 1992)