Module:	**Elective Advanced Lectures: BCGS Courses**
Module No.: physics70d	

Course: **Nonequilibrium physics with interdisciplinary applications (T)**

Course No.:

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 desription (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)