

SLUkurs

Syllabus

POG0014 Graduate course in biodynamics, 7.5 credits

Syllabus approved

2002-08-07

Subjects

Statistics, Computer Science and Systems Science

Education cycle

Third cycle

Grading scale

Pass / Failed

The requirements for attaining different grades are described in the course assessment criteria which are contained in a supplement to the course syllabus. Current information on assessment criteria shall be made available at the start of the course.

Language

English

Prior knowledge

None

Objective, including learning outcomes

The course is intended to give deeper knowledge about biological systems and processes with the aid of mathematical models and biophysical theory.

Content

Mathematical description of biological processes, from biomolecules to ecosystems and evolution. Dynamics of biomolecules, neurodynamics, population dynamics, evolutionary dynamics. Theories for the origin and evolution of life. Modelling and optimization of genetic and biochemical networks. Efficiency calculations. Theories for biological and artificial neural networks, with computer simulations of brain dynamics. Examples with mathematical description of various physiological and ecological processes. Oscillations, chaos and noise. The stability-flexibility dilemma. The role of fluctuations. Transitions between different levels of complexity and organization.

Requirements for examination

Written exam and exercises during the course

Additional information**Responsible department**

Department of Energy and Technology