



Universität Ulm

Master of Science Physics (PO 2019)

Seminar Statistical Methods

Code 8812875150

ECTS credits 3

Attendance time 2

Language of instruction English

Duration 1

Cycle each Winter Semester

Coordinator Dean of Physics Studies

Instructor(s) PD Dr. Jürgen Stockburger

Allocation of study programmes Physics M. Sc., elective module
Wirtschaftsphysik M. Sc., elective module

Recommended prerequisites Working knowledge of mathematical stochastics (Wahrscheinlichkeitsrechnung)

Learning objectives Stochastic methods offer a theoretical approach to the behaviour of complex systems with a good balance between reducing complexity and gaining predictive power. We consider techniques beyond the scope of our regular course work as well as examples in economics and physics.

Syllabus The following topics are planned:

- Introduction to stochastic processes and models
- Non-Markovian processes and "fat tails"
- Lévy processes
- Statistical distribution of income and wealth
- Network theory
- Correlations and clustering
- Agent-based modelling
- Stochastic modelling in quantum dynamics

Literature

- textbook chapters
- review articles
- original research articles

Teaching and learning methods Seminar (2 hours per week)

Workload 90 hours

Assessment The module examination consists of working on a given topic. The colloquium and the participation in the discussion will be graded. At the beginning of the seminar the topics will be assigned and the examination details will be announced. No prerequisites are necessary for exam registration.

Grading procedure The grade of the module will be the grade of the exam.

Basis for
