

Data:	STOMATE. MA. Nr. 3221 / Examination number: 11709	Version: 05.07.2016	Start Year: WiSe 2016
Module Name:	Stochastic Methods for Materials Science		
(English):			
Responsible:	van den Boogaart, Gerald / Prof. Dr. Ballani, Felix / Dr. rer. nat.		
Lecturer(s):	van den Boogaart, Gerald / Prof. Dr. Ballani, Felix / Dr. rer. nat.		
Institute(s):	Institute of Stochastics		
Duration:	1 Semester(s)		
Competencies:	The student will understand the role of stochastic modelling and stochastic algorithms for computational material sciences. He/she will learn to select, implement and test stochastic algorithms and models in an applied context.		
Contents:	The lecture introduces examples of stochastic methods of material modeling, analysis and simulations: e.g. models and algorithms for the simulation of random structures (random mosaics, random composites, packing, ...) and random behavior (crack initiation, random loads, random fatigue, ...), statistical and stereological analysis of structural data and EBSD-crystal orientation measurements, Monte-Carle algorithms for material simulation, Markov-Chain-Monte-Carlo/Metropolis-Hastings algorithms for parameter estimation and structure reconstruction.		
Literature:	e.g. Chiu, Stoyan, Kendall, Mecke: Stochastic geometry and its applications, 3 rd ed. Wiley, Chichester, 2013		
Types of Teaching:	S1 (WS): Lectures (2 SWS)		
Pre-requisites:	Recommendations: Basic knowledge of stochastic, statistic, geometry, continuum mechanics, computer programming, and either crystallography or basic group theory.		
Frequency:	yearly in the winter semester		
Requirements for Credit Points:	For the award of credit points it is necessary to pass the module exam. The module exam contains: MP [30 min] AP: Programming Project		
Credit Points:	4		
Grade:	The Grade is generated from the examination result(s) with the following weights (w): MP [w: 1] AP: Programming Project [w: 1]		
Workload:	The workload is 120h. It is the result of 30h attendance and 90h self-studies.		