

Data:	ADVTCMS. MA. Nr. 3587 / Examination number: 44508	Version: 08.05.2017	Start Year: WiSe 2018
Module Name:	Advanced Topics of Computational Materials Science		
(English):			
Responsible:	Sandfeld, Stefan / Prof. Dr.		
Lecturer(s):	Sandfeld, Stefan / Prof. Dr.		
Institute(s):	Institute of Mechanics and Fluid Dynamics		
Duration:	1 Semester(s)		
Competencies:	Students will get familiar with the most recent developments in computational materials science and current state-of-the-art methodologies. They will learn advanced methods for data analysis and data-driven research and will be able to apply those to new problems.		
Contents:	This advanced course will cover topics such as size and scale dependent behavior, where students will get an overview over current developments and will also be able to study such phenomena by hands-on simulations. The importance of multiphysical and coupled phenomena will be discussed together with an introduction of the technical details relevant for the numerical implementation of such materials science problems. Advanced methods for data analysis, optimization and data-driven research will be introduced (such as neural networks or machine learning). These will be applied in the hands-on programming sessions, where the emphasis is on applying the methods from the lecture to problems with materials scientific relevance.		
Literature:			
Types of Teaching:	S1 (WS): Lectures (2 SWS) S1 (WS): Exercises (1 SWS)		
Pre-requisites:	Recommendations: Basic knowledge of Python scripting		
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/KA (KA if 8 students or more) [MP minimum 15 min / KA 90 min]		
Credit Points:	4		
Grade:	The Grade is generated from the examination result(s) with the following weights (w): MP/KA [w: 1]		
Workload:	The workload is 120h. It is the result of 45h attendance and 75h self-studies.		