

Department	06 Applied Sciences and Mechatronics
Course title	System Modelling and Optimization
Hours per week (SWS)	4
Number of ECTS credits	6
Course objective	The subject imparts the ability to simplify the processes in physical systems for the application either with models of concentrated parameters based on equations and to implement the model equations in Python, or to select data-based modelling for the description, and implement these with supervised learning as regression models in deep neural networks in Python.
Prerequisites	Bachelor in physics or engineering
Recommended reading	J. Frochte, Mascinelles Lernen: Grundlagen und Algorithmen in Python, Hanser 2019 D. Osinga, Deep Learning Cookbook, O'Reilly 2018 Scikit-learn: Machine Learning in Python, Pedregosa et al., JMLR 12, pp. 2825-2830, 2011
Teaching methods	seminaristic teaching with Jupyter Notebooks, internship for Python, simulation study in small team with
Assessment methods	40% written exam 90', 60% written report / Notebook
Language of instruction	English
Name of lecturer	Prof. Dr. Alfred Kersch
Email	akersch@hm.edu
Link	https://sci-intern.hm.edu/fk/modulbeschreibungen.php?id=652&lang=en
Course content	Equation based modeling with, data based modeling, deep neural networks, Python, Jupyter Notebooks, own simulation study
Remarks	