

Aushang
'Blockkurs' 31.8.-4.9.

Environmental Modeling using Python

Prof. Ekkehard Holzbecher
German Univ. of Technology in Oman, Muscat

Der Blockkurs 'Environmental Modeling' wird in diesem Jahr **nicht** im CIP-Pool des Lankwitz Campus stattfinden. Aufgrund der Situation bzgl. des COVID19 Virus wird er online abgehalten. Er basiert auch nicht mehr auf der MATLAB software. Stattdessen ist Python die Programmiersprache der Wahl. Alle Interessenten werden gebeten, sich vor Kursbeginn mit dem Dozenten in Verbindung zu setzen (ekkehard.holzbecher@gutech.edu.om), um die Modalitäten des Online-Zugangs sowie der Software Installation abzuklären.

Kurzbeschreibung:

The course's aim is twofold:

- A. to introduce basic concepts of modeling environmental systems
- B. to exercise the application of Python as free software package for scientific computing

The course is designed to

1. be a door opener to the field for novices without any background knowledge of environmental modeling and of Python, and
2. to surprise those, who have some expertise, with advanced methods which they have not been aware of.

Python was chosen as the computer tool for modeling, because it is

- i. powerful,
- ii. versatile,
- iii. easy,
- iv. popular,
- v. free.

The first part of the course focuses on Python: (1) welcome to Python, (2) Integrated Developer Environment (IDE), (3) programming, (4) program control flow. The second part introduces basic concepts of environmental modeling: (5) networks and compartmental models, (6) non-linear ODE models, (7) fluid flow simulation, including porous media flow, (8) general transport simulation, including biogeochemistry. For the later topics data visualization techniques are taught as relevant presentation methods. The third part deals with advanced topics: (9) statistical models, (10) parameter estimation and (11) Geo-Information Systems.

The course is partially built on the book: Environmental Modeling using MATLAB, Springer Publ., Heidelberg/Berlin/New York (2nd ed), 2012, by the lecturer.