Scientific Programming

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Module number	Credits	Workload	Semester[s]	Duration	Group size
CE-P04/SE-O-10/SP	6 CP	180 h	3 Sem.	1 Semester[s]	no limitation

Courses	Contact hours	Self-study	Frequency
a) Scientific Programming	a) 4 WLH (60 h)	a) 120 h	a) each winter

Module coordinator and lecturer(s)

Prof. Dr. Andreas Vogel

a) Prof. Dr. Andreas Vogel, Assistants

Admission requirements

Learning outcome, core skills

After successfully completing the module, the students

- have acquired the fundamental skills for the development of software solutions, including programming concepts and constructs, data structures and algorithms,
- are able to analyze problems with respect to their structure and requirements and are capable of designing and implementing suitable software code,
- can implement typical problems in scientific computing using the Python programming language and are able to quickly adapt the learned concepts to other programming languages.

Contents

a)

The lecture covers programming concepts such as

- procedural programming, including data types, statements and functions,
- object-oriented programming, including encapsulation, polymorphism and inheritance,
- generic programming.

Furthermore, fundamental data structures as well as efficient algorithms are presented, relevant software libraries are surveyed, and the organization of software projects is discussed.
In hands-on sessions, programming exercises are used to discuss and illustrate the presente

Educational form / Language

a) Tutorial (2 WLH) / Lecture (2 WLH) / English

Examination methods

• Written exam 'Scientific Programming' (120 min., Part of modul grade 100 %)

Requirements for the award of credit points

- Passed final module examination

Module applicability

- M.Sc. Computational Engineering
- M.Sc. Subsurface Engineering

Weight of the mark for the final score

Percentage of total grade [%] = 6 * 100 * FAK / DIV

FAK: The weighting factors can be taken from the table of contents.

DIV: The values can be taken from the table of contents.
Further Information