

Scientific Programming					
Module-No./Abbreviation	Credits	Workload	Term	Frequency	Duration
CE-P04, SE-O-10/SP	6 CP	180 h	1 st Sem.	Winter term	1 Semester
Courses Scientific Programming			Contact hours 4 SWS (60 h)	Self-Study 120 h	Group Size: No Restrictions
Prerequisites -					
Learning goals / Competences: After successfully completing the module, the students <ul style="list-style-type: none"> • 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 capable to design and implement suitable software applications, • can code typical programs for scientific computing using the Python programming language and are able to quickly adapt the learned concepts to other programming languages. 					
Content The lecture covers programming concepts such as <ul style="list-style-type: none"> • procedural programming techniques, including statements, control flow and constructs, • object-oriented programming and modeling, including encapsulation, polymorphism, inheritance as well as UML diagrams, • 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 presented content, employing the Python programming language for selected scientific applications.					
Teaching methods / Language Lecture (2h / week), Exercise (2h / week) / English					
Mode of assessment Written examination (120 min., 100%)					
Requirement for the award of credit points Passed final module examination					
Module applicability MSc. Computational Engineering, MSc. Subsurface Engineering					
Weight of the mark for the final score -					
Module coordinator and lecturer(s) Prof. Dr. A. Vogel, Assistants					
Further information					