Module name	**Data Visualisation**
Module number	CMS-COR-VIZ
Senior Lecturer	Prof. Dr. Stefan Gumhold
Qualification objectives	Students master the basics and practices of scientific visualisation of measurement and experimentation data, as well as simulation results. They know the basics of visual perception and their influence on the design of visualisations. Students can safely specify data by dimension, characteristic types and structure and select visual attributes suitable for a given specification. They are familiar with the most important visualisations for two-, three- and multidimensional observation rooms, as well as for scalar, vector, tensor-value and multidimensional features. They are competent to select appropriate techniques for the specific visualisation task. Students are familiar with basic presentation and interaction techniques and can fundamentally implement them in an interactive visual analytics system. They are familiar with the main visualisation frameworks, have gained practical experience with them and are able to select them appropriately for their tasks.
Contents	The content of the module is the basis of data visualisation, in terms of visualising data of different types on visual attributes and insights into the visual perception of humans.
Forms of teaching and learning	The module includes lectures of 2 SWS, exercises of 2 SWS and self-study. The language of the lectures and exercises will be English.

Eligibility for participation	Knowledge of sequential computer programming, algorithms and data structures, analysis of functions of one or more variables, basic data analytics techniques, and linear algebra, in particular vector and matrices calculation at bachelor level, are required. The following literature is suitable for preparation: 1. Algorithms – the spirit of computing. David Harel. Addison-Wesley, 2004, 2. C++ from the ground up. Herbert Schildt. McGraw-Hill, 2003, 3. Structure and Interpretation of Computer Programs, Hal Abelson, Gerald Jay Sussman. With Press, 1985, 4. Introduction to Algorithms, 2nd edition. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein. With Press, 2001, 5. Multivariable Calculus with Applications (Undergraduate Texts in Mathematics). Peter D. Lax, Maria Shea Terrell, Springer, 2018, 6. Linear algebra. Jim Hefferon, http://joshua.smcvt.edu/linearalgebra, 2008.
Usability	In the Masters Course Computational Modeling and Simulation, the module is a compulsory optional module of the basic technical training, to be selected in accordance with Annex 1 to the Specific Examination Regulations. The module cannot be chosen in the Master's Course Computational Modeling and Simulation if this or a module with substantially the same content from a Course with which the entry conditions under § 3 of the Studienordnung have been met has already been completed. The module provides the pre-requisites for the modules it designates under the pre-requisites for participation.
Conditions for the award of credits	Credits are awarded when the module test is passed. The module test consists of a 90-minute away day. The language of the test will be English.
Credits and marks	The module allows 5 credit points to be obtained. The module score corresponds to the test performance score.
Frequency of the module	The module is offered every winter semester.
Workload	The total workload is 150 hours.
Duration of the module	The module covers 1 semester.