Only the german version of the module description as part of the study regulations is legally binding.

Module name	**Digitization and Data Analytics**
Module number	INF-25-Ma-FTI-DDA
Responsible lecturer	Prof. Dr. Wolfgang Nagel wolfgang.nagel@tu-dresden.de
Qualification objec-Tives	Students understand various concepts for data storage and metadata collection and can develop data management concepts for existing data sets. They know and understand various methods of data pre-processing, exploratory data analysis and machine learning, can assess their strengths and weaknesses in relation to given data and apply the methods with the help of current software frameworks both locally and on an HPC infrastructure.
Content	The contents of the module are current approaches to analyzing large amounts of data (big data) for specific computer architectures as well as processing in the environment of high-performance computing (HPC), various data analytics approaches and their use in the HPC environment. Further content includes data analytics frameworks, the basics of statistical analysis and methods from machine learning as well as selected applications.
Teaching and learning methods	The module comprises lectures of 2 SWS, exercises of 2 SWS and the self bststudium. The language of instruction for the lectures and exercises is English.
Prerequisites for par-ticipation	In the Diploma degree program in Computer Science, the skills acquired in the modules INF-25-Ba-Ma1 Linear Algebra and Analysis and INF-25-Ba-Ma4 Probability Theory and Statistics are required. In the Master's degree program Computer Science, knowledge of statistics and linear algebra as well as knowledge of the use of Python at Bachelor's level are required. The following literature is suitable for preparation: Mathematics for Engineers II: Calculus and Linear Algebra, G. Baumann. Oldenbourg Verlag, 2010. http://dx.doi.org/10.1524/9783486598476, All of Statistics, L. Wasserman. Springer. 2004. https://link.springer.com/book/10.1007/978-0-387-21736-9, Python for Data Analysis 3rd Ed., W. McKinney. O'Reilly Media, 2022. https://learning.oreilly.com/library/view/-/9781098104023/?ar.
Applicability	The module is a compulsory elective module in the Computer Engineering and High Performance Computing subject area in the main course of the Diplom degree program in Computer Science, which must be selected in accordance with Annex 2 to the examination regulations. In the Master's degree program in Computer Science, the module is a compulsory elective module in the open track in the subject area of Computer Engineering and High Performance Computing and the supplement, which must be selected in accordance with Annex 2 to the Examination Regulations. The module can only be chosen once in the Master's degree program Computer Science . The module cannot be selected in the

	Master's degree program in Computer Science if this module or a module with the same content from a degree program in which the admission requirements according to § 3 of the study regulations have been fulfilled has already been completed. The module fulfills the prerequisites for the modules listed under prerequisites for participation.
Requirements for earning credit points	The credit points are earned if the module examination is passed. The module examination consists of a written examination lasting 90 minutes. The examination language is English.
Credit points and grades	6 credit points can be earned through the module. The module grade corresponds to the grade of the examination.
Module frequency	The module is offered every summer semester.
Workload	The total workload is 180 hours.
Module duration	The module comprises one semester.