Georg-August-Universität Göttingen **Modul B.Inf.1712: Vertiefung Hochleistungsrechnen** *English title: Advanced High Performance Computing*	6 C 4 SWS

Lernziele/Kompetenzen: Die Studierenden haben vertiefte Kenntnisse und Kompetenzen auf einem Gebiet aus dem Bereich Hochleistungsrechnen erworben. Beispiele für solche Gebiete sind High-Performance Data Analytics.	**Arbeitsaufwand:** Präsenzzeit: 56 Stunden Selbststudium: 124 Stunden

Lehrveranstaltung: High-Performance Data Analytics (Vorlesung, Übung) *Inhalte*: Data-driven science requires the handling of large volumes of data in a quick period of time. Executing efficient workflows is challenging for users but also for systems. This module introduces concepts, principles, tools, system architectures, techniques, and algorithms toward large-scale data analytics using distributed and parallel computing. We will investigate the state-of-the-art of processing data of workloads using solutions in High-Performance Computing and Big Data Analytics. Topics cover: • Challenges in high-performance data analytics • Use-cases for large-scale data analytics • Performance models for parallel systems and workload execution • Data models to organize data and (No)SQL solutions for data management • Industry relevant processing models with tools like Hadoop, Spark, and Paraview • System architectures for processing large data volumes • Relevant algorithms and data structures • Visual Analytics • Parallel and distributed file systems Guest talks from academia and industry will be incorporated in teaching that demonstrates the applicability of this topic. Weekly laboratory practicals and tutorials will guide students to learn the concepts and tools. In the process of learning, students will form a learning community and integrate peer learning into the practicals. Students will have opportunities to present their solutions to the challenging tasks in the class. Students will develop presentation skills and gain confidence in the topics.	4 SWS
Prüfung: Klausur (90 Min.) oder mündliche Prüfung (ca. 30 Min.) **Prüfungsanforderungen:** High-Performance Data Analytics • Challenges in high-performance data analytics • Use-cases for large-scale data analytics • Performance models for parallel systems and workload execution • Data models to organize data and (No)SQL solutions for data management • Industry relevant processing models with tools like Hadoop, Spark, and Paraview	6 C

- System architectures for processing large data volumes
- Relevant algorithms and data structures
- Visual Analytics
- Parallel and distributed file systems

Zugangsvoraussetzungen: keine	**Empfohlene Vorkenntnisse:** Basic programming skills, Basic knowledge of Linux operating systems, Python
Sprache: Englisch	**Modulverantwortliche[r]:** Prof. Dr. Julian Kunkel
Angebotshäufigkeit: unregelmäßig	**Dauer:** 1 Semester
Wiederholbarkeit: zweimalig	**Empfohlenes Fachsemester:** Bachelor: 5 - 6; Master: 1 - 4
Maximale Studierendenzahl: 50	