

Modul: Selected Topics in Efficient Algorithms

Inhalt: The design and analysis of algorithms is a fundamental area in computer science. While basic courses on algorithms and data structures cover the core material, this course will address a number of topics that have received quite some research interest internationally over the past years. More specifically, we will focus on the following topics.

- Online algorithms: Classical algorithm design assumes that all relevant data is known in advance. However, in many practical applications, data arrives incrementally over time. Despite the handicap of not knowing the future, we seek algorithms with a provably good performance.
- Approximation algorithms: Many optimization problems are NP-hard and hence no efficient algorithm for computing optimal solutions is known. Here we wish to design polynomial time algorithms that compute approximate solutions close to the true optimum,
- Algorithmic game theory: Many large systems, such as the Internet, are not controlled by a central authority but rather by a set of economic agents that usually have selfish interests. In this context one is interested in stable states where no agent has the incentive to deviate from its strategy and in the quality of such states.

Qualifikationsziele: Students know the important results and techniques in the three algorithmic fields listed above and are able to apply them to resolve new problems.

ggf. Voraussetzungen für die Teilnahme am Modul:

Erfolgreiche Teilnahme an den Veranstaltungen "Einführung in die Theoretische Informatik" und "Algorithmen und Datenstrukturen".

Lehrveranstaltungen	SWS	SP und Beschreibung der Arbeitsleistung, auf deren Grundlage die SP vergeben werden
<i>z.B. VL +UE, VL+PR etc.</i>	4 VL +2 UE	8 SP Es sind wöchentlich Übungsaufgaben zu bearbeiten.
Voraussetzung für die Vergabe von Studienpunkten	Voraussetzung für die Prüfungszulassung ist das Erreichen von mind. 50% der maximal erzielbaren Übungspunkte sowie das zweimaliges Vorrechnen einer Übungsaufgabe.	
Prüfung (Prüfungsform, Umfang/Dauer, SP)	mündliche Prüfung (30 Minuten)	
Häufigkeit des Angebots	unregelmäßig	
Dauer des Moduls	1 Semester	