Universität Hamburg
DER FORSCHUNG | DER LEHRE | DER BILDUNG

FAKULTÄT
FÜR BETRIEBSWIRTSCHAFT

PhD Course

Matheuristics

block course:

building VMP 5

July 3: 9 am-8 pm, 1068

July 4: 9 am-8 pm, 3136/42

July 5: 9 am-8 pm, 2053

July 6: 9 am- 8 pm, 3136/42

Course Instructor: Prof. Dr. Stefan Voß

Course Value: 2 SWS or 5 LP

Course Objectives:

Matheuristics refer to a broad class of hybrid algorithms in which exact approaches and metaheuristics are combined. This course introduces students to the fundamentals of metaheuristics and matheuristics and lets them understand the interplay between the different methods and their hybridization. Students learn to develop solution methods for efficiently solving optimization problems.

Students are supposed to grasp the steps from a basic understanding of well-known *heuristics* (like greedy approaches) and *metaheuristics* (like simulated annealing, tabu search, etc.) towards including *mathematical programming* techniques into a solution framework, giving rise to matheuristic algorithms. In this course, we consider a component-based approach to the design of matheuristics. Whilst it is possible to intertwine components in various ways to assemble a matheuristic, we mostly focus on approaches using two types of components in a nested fashion, i.e., either an exact method is used within a metaheuristic framework, or a metaheuristic is used within an exact method. The course will feature some hands-on experience on these progressively complex approaches to the solution of optimization problems, especially arising in an industrial or business context (like logistics).

While we shall provide sample problems from logistics, we also aim to incorporate problems provided by the students to exemplify concepts. Matheuristics of interest include decomposition methods, local branching or the corridor method, POPMUSIC and possibly others. Successful participants will be able to deal with the complexity of real-world decision problems.

Student body:

The course is aimed at Ph.D. students in information systems, business administration, industrial engineering and computer science.

Student evaluation:

A successful completion of work assignments.

Teaching language: English

Registration: via E-mail to the IWI Secretariat <IWI@uni-hamburg.de>