Technology
Arts Sciences
TH Köln

Course
KOGA - Combinatorial Optimization and Graph Algorithms

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General information

Long name	Combinatorial Optimization and Graph Algorithms
Approving CModule	KOGA_MaTIN
Responsible	Prof. Dr. Hubert Randerath Professor Fakultät IME
Level	Master
Semester in the year	winter semester
Duration	Semester
Hours in self-study	78
ECTS	5
Professors	Prof. Dr. Hubert Randerath Professor Fakultät IME
Requirements	Basic knowledge in graph theory Basic knowledge in algorithmics
Language	German
Separate final exam	Yes

Final exam

Details

Written exam. In case of a low number of participants the exam might be oral.

Minimum standard

Normally, 50% of achievable exam point suffice to pass the exam (with a 4.0 grade)

Exam Type

Written exam. In case of a low number of participants the exam might be oral.

Lecture / Exercises

Learning goals

Knowledge

- Basics of Graph Theory und Combinatorial Optimization
- Minimal Spanning Trees: algorithms of Kruskal, Prim und Tarjan, Greedy algorithms, matroids, Steiner trees, network design
- Linear Programs: structure, modelling, normalization, Simplex algorithm, Theory of Duality
- Weighted Matchings and the Routhe Inspection Problem: Weighted Matchings in Bipartite Graphs and non-bipartite Graphs, algorithms of Floyd-Warshall and Fleury
- Network Flows: Network Theory Basics, Dinic's algorithms, cost-optimial flows
- selected discreet and combinatorial optimization problems: Travelling Salesman, Channel Assignment Problem, scheduling problems, routing problems

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Lecture	2
Exercises (whole course)	2
Exercises (shared course)	0
Tutorial (voluntary)	0

Separate exam

none