

Course Manual KOGA

Combinatorial Optimization and Graph Algorithms

Version: 1 | Last Change: 25.01.2020 18:25 | Draft: 0 | Status: vom verantwortlichen Dozent freigegeben

– General information

Long name	Combinatorial Optimization and Graph Algorithms
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Approving CModule	KOGA MaTIN
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Responsible	Prof. Dr. Hubert Randerath <small>Professor Fakultät IME</small>
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Valid from	winter semester 2020/21
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Level	Master
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Semester in the year	winter semester
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Duration	Semester
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Hours in self-study	78
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ECTS	5
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Professors	Prof. Dr. Hubert Randerath <small>Professor Fakultät IME</small>
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Requirements	Basic knowledge in graph theory Basic knowledge in algorithmics
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Language	German
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Separate final exam	Yes
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Literature

Final exam

Details	Written exam. In case of a low number of participants the exam might be oral.
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Minimum standard	Normally, 50% of achievable exam point suffice to pass the exam (with a 4.0 grade)
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Exam Type	EN Klausur
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– Lecture / Exercises

Learning goals

Goal type	Description
Knowledge	<ul style="list-style-type: none">- 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 Route 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-optimal flows- selected discrete and combinatorial optimization problems: Travelling Salesman, Channel Assignment Problem, scheduling problems, routing problems

Special requirements

none

Accompanying material

- Lineare und Netzwerk-Optimierung, H.W. Hamacher, Vieweg-Verlag
- CATBOX - An Interactive Course in Combinatorial Optimization, W. Hochstättler, A. Schliep, Springer-Verlag
- Graphentheoretische Konzepte und Algorithmen, S. O. Krumke, H. Noltemeier, Teubner-Verlag
- Combinatorial Optimization - Polyhedra and Efficiency, A. Schrijver, Springer-Verlag Dozenten

Separate exam

No

Expenditure classroom teaching

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