

Network Algorithms

Chapter 0 Preamble

- Who are we?
- The topics of „Algorithmic Aspects of Communication Networks“
- Resources



Who are we?

- Fachgebiet „Telematik/Rechnernetze“
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 - Web page: <http://www.tu-ilmenau.de/fakia/telematik.html>



- Fachabteilung Diskrete Mathematik und Algebra
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- ❑ In general: architectures and protocols of communication systems
 - ❑ Structure, design, performance evaluation, implementation, ...
 - ❑ For all types of communication: computer networks, voice communication, data & multimedia content, technical communication (control devices)
 - ❑ Special focus on security issues
- ❑ More specifically:
 - ❑ Security requirements of communication services
 - Authenticity, integrity, confidentiality of peer entities and exchanged data
 - ❑ Security aspects of protocol mechanisms
 - What side “security relevant” side-effects are introduced by specific mechanisms?
 - ❑ How to protect communication infrastructures
 - Main issue: How to ensure availability of systems and offered services?



- ❑ Special course on algorithmic aspects in communications
- ❑ Prior attendance of courses Telematics 1 and 2 (Bachelor Informatik) highly recommended:
 - ❑ Basics of getting information through a network (with focus on the Internet)
 - ❑ Protocol layers 1 to 4
 - ❑ Internet application layer
 - ❑ Advanced topics like multimedia communications, QoS, performance, etc.
- ❑ Network Algorithms will cover the following topics:
 - ❑ Main question: How to organize data transport so that the network can handle the offered (legitimate) load?
 - Basics of packet oriented communication networks
 - Forwarding and routing
 - Network design
 - Monitoring and handling load
 - Failure resistance



- Slides are/will be available on the web site
- Main text for this course
 - Michal Pioro, Deepankar Medhi. *Routing, Flow, and Capacity Design in Communication and Computer Networks*. The Morgan Kaufmann Series in Networking, Elsevier, 2004.
- There will be no dedicated script
 - Secondary literature is sometimes beneficial (and will be cited)
- One additional source:
 - Thomas Erlebach. *Algorithmen für Kommunikationsnetze*. Script

