Algorithmic Aspects of Communication Networks

Chapter 0
Preamble

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

Who are we?

❑ Fachgebiet „Telematik/Rechnernetze"

  ❑ Prof. Dr.-Ing. Günter Schäfer
     guenter.schaefer@tu-ilmenau.de

  ❑ Web page: http://www.tu-ilmenau.de/fakia/telematik.html

❑ Fachabteilung Diskrete Mathematik und Algebra

  ❑ Prof. Dr. rer. nat. habil. Thomas Böhme
     thomas.boehme@tu-ilmenau.de

  ❑ Web page: http://www.tu-ilmenau.de/fakmn/Diskrete-Mathematik.dma.0.html

Main Research Topics (of Günter Schäfer)

❑ 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?

Topics of "Algorithmic Aspects of Communication Networks"

❑ 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.
❑ Algorithmic Aspects of ComNets 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
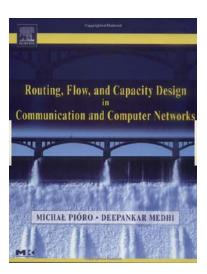   ∎ Failure resistance

❑ 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