Foundations of Telematics

Chapter 0
Preamble

- Who are we?
- The topic of „Foundations of Telematics“
- Research and teaching at „Fachgebiet Telematik/Rechnernetze“
- Formalities (resources, exams)

http://www.tu-ilmenau.de/fakia/Grundlagen-der-Telem.6153.0.html

Who are we?

- Fachgebiet „Telematik/Rechnernetze“
  - Dr.-Ing. Günter Schäfer
    g.schaefer@ieee.org oder guenter.schaefer@tu-ilmenau.de
  - Dr.-Ing. Werner Horn
  - Dipl.-Inform. Thorsten Strufe
  - Web page:
    - http://www.tu-ilmenau.de/fakia/telematik.html
- Teaching (SS 2007):
  - VL Telematik I
  - VL Grundlagen der Telematik (MT,WIW)
  - VL Grundlagen der Telematik (AMW)
  - VL Schutz von Kommunikationsinfrastrukturen
  - VL Öffentliche Netze
  - Hauptseminar Telematik
  - Projektseminar: Simulation von Internet-Protokollfunktionen
  - Komplexpraktikum

Topic of “Foundations of Telematics”

- Have you ever wondered what *really* happens when
  - Typing http://www.tu-ilmenau.de into a Web browser?
  - Making a phone call?
- How does data get from one device to another?
  - Basic abstractions have been treated in KMS
  - What happens “behind the scene” and “on the wire”?
- Communication systems enable this transport of data
  - What are the necessary ingredients for such systems? Typical components?
  - Are there any basic mechanisms to put such components together? To organize their working together?
  - How can we cope with size, complexity, failures, user demands, … in such systems?

Topic of “Foundations of Telematics”

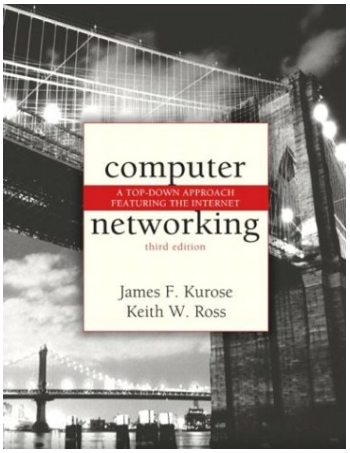
- This lecture is about basic architecture and protocol mechanisms
  - Attempts to give an overview of all important components
  - Essentially, a round-up of all layers of ISO/OSI model
  - For both data communication and voice / “telecommunication”
- It is not about specific technical solutions
- It is not about mobile and wireless communication
  - Covered in follow-up lectures
  - Requires “Telematics I” as pre-requisite
- It is not about distributed systems
  - Rather, builds the foundation for them to work
- It is not about network security
  - There is a specific lecture on this topic during the winter term

Formalities – Resources

- Slides are/will be available on the web site
- There will be no script; the lecture follows the textbook [KR04]
  - Secondary literature is sometimes beneficial
- To give due credit where credit is due:
  - The set of slides we will use in this lecture has been prepared by the authors of [KR04] **J. F. Kurose** and **K. W. Ross** (besides maybe some additions, that I may introduce during the term)
  - Additional material (text, pictures, graphs, pictograms, etc.) will potentially be added from lectures given by Profs. Krüger, Juling, Zitterbart, Schiller, Carle, Karl at the Universities Karlsruhe, Braunschweig, Kiel, FU Berlin, Tübingen, Paderborn
  - Many thanks in advance to everybody, who contributed material that may be adopted during the course of this class

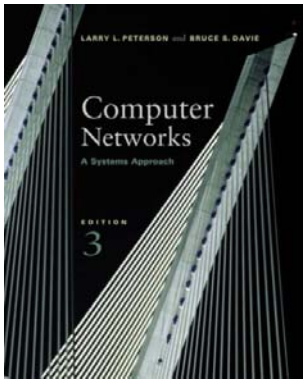
Formalities – Basic Textbook for this Class

- J. F. Kurose & K. W. Ross, *Computer Networking: A Top-Down Approach Featuring the Internet*, 2004, 3rd edition, Addison Wesley
  - Motivates why communication systems are built in a certain fashion by starting out from the applications that they should support
    (a German version is available for ~30 Euro)

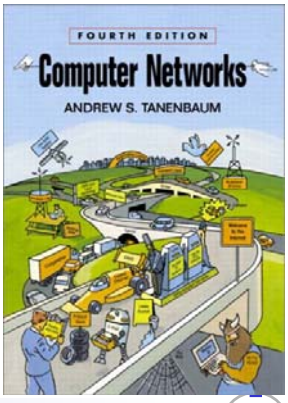


Secondary Book Recommendations

- L. L. Peterson & B. S. Davie, *Computer Networks – A Systems Approach*, 2003, 3rd edition, Morgan Kaufman
  - Rather technical approach, quickly gets down to „how to build it“ questions
  - Maybe a bit quick on the beginner, though

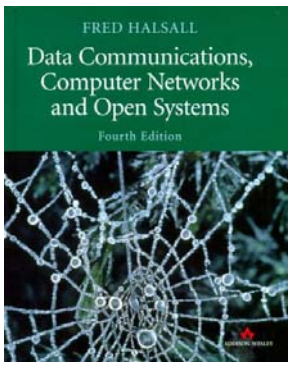


- A. Tanenbaum, *Computer Networks*, 2004, 4th edition, Prentice-Hall
  - Classic textbook, excellent tutorial style, if occasionally a bit lengthy
  - Do not use an earlier edition; they are partially outdated
  - Do not use a translation
  - Good command of English is necessary anyway

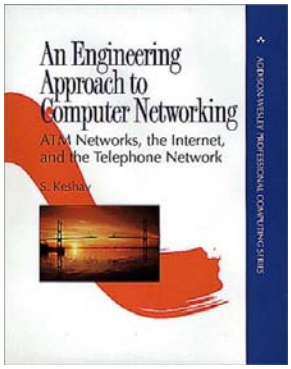


Further book recommendations

- F. Halsall: *Data Communications, Computer Networks and OSI*. Addison-Wesley, 4. Auflage, 1997
  - Similar to Tanenbaum, more details, particularly good for lower-layer questions
  - Unfortunately, no longer updated

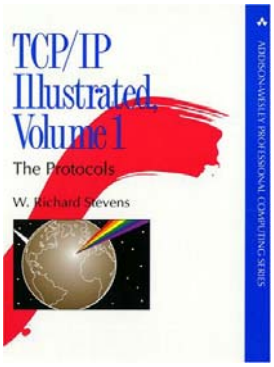


- S. Keshav: *An Engineering Approach to Computer Networking*. Addison-Wesley, 1999
  - Excellent book for fundamental treatments, some good theory chapters
  - Also explains *why* some design choices are made
  - Unfortunately, also a bit outdated

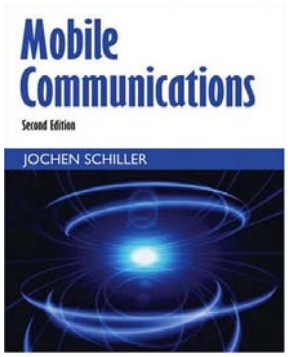


Further book recommendations

- W.R. Stevens: *TCP/IP Illustrated, Vol. 1- 3,* 1994, Addison-Wesley
  - If you want to know everything about TCP/IP



- J. Schiller, Mobile communication, 2nd edition, 2003, Addison Wesley
  - Details on mobile communication



Formalities – Exam

- There will be a written exam
  - Unless number of participants is too small, then oral examination
  - Date, place, details to be announced
  - No additional material (books, slides, etc.) allowed during exam
- Both lecture and exercise material are relevant for the exam