# Master Kurs
# Rechnernetze
# Computer Networks
# IN2097

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# Course organization

- Lecture
  - Thursday, 10.15-11.45, HS 2
  - Friday, 10.15-11.45, HS 2
- Exercises
  - Typically Bi-weekly, Friday 10.15-11.45, HS 2 (may vary)
- Students are requested to subscribe to lecture and exercises at
  http://www.net.in.tum.de/de/lehre/ws0809/vorlesungen/master-networks
- Email list
  - for subscribers to lecture and exercises
- Questions and Answers / Office hours
  - Prof. Dr. Georg Carle, carle@net.in.tum.de
    - After the course
    - Office hours: upon reservation, possibly Thursday, 12.30 to 13.30
  - Dr. Thomas Fuhrmann, fuhrmann@net.in.tum.de

# Course Material

- Course Material
  - All slides will be made available online.
    Slides may be updated during the course.
  - The first part of the course focuses on Internet Protocols
    Material by Thomas Fuhrmann
  - The second part of the course is heavily based on the course
    CS653 "Advanced Computer Networks" by Prof. Jim Kurose,
    University of Massachusetts, Amherst.
    http://www-net.cs.umass.edu/cs653/schedule.htm
  - The permission by Jim Kurose to use his material is gratefully
    acknowledged!
- Prerequisites
  - A first course on Computer Networks
    - e.g. Introduction to computer networking and distributed
      systems, IN0010, c.f.
      http://www.net.in.tum.de/teaching/SS08/rn1/uebungen/

# Fundamental Books

- J. F. Kurose & K. W. Ross, *Computer Networking: A Top-Down Approach Featuring the Internet*, 2007, 4th edition, Addison Wesley
  - Innovation: Presentation of Protocols Top-Down
  - Statements of key persons in networking research

- L. L. Peterson & B. S. Davie, *Computer Networks – A Systems Approach*, 2007, 4th edition, Morgan Kaufman
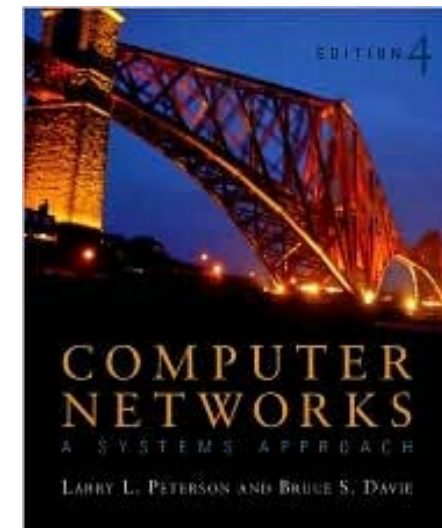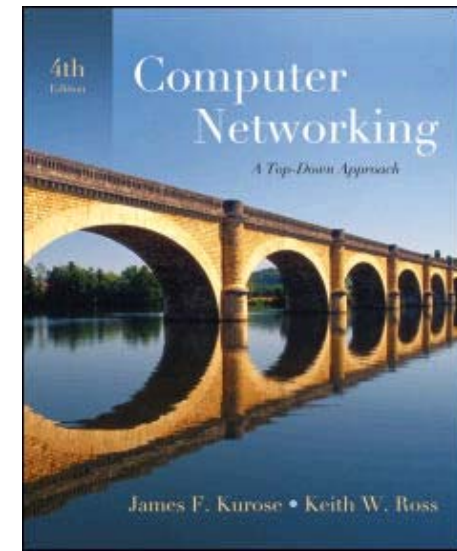
# Fundamental Book - IN0010

- ❑ Andrew S. Tanenbaum:
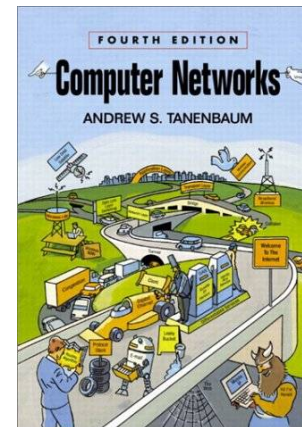
  - ▪ *Computer Networks*
    Prentice-Hall, **4th edition** 2003
    ISBN-10: 0130661023, 80 €

  - ▪ (German translation of this edition
    unfortunately of low quality,
    Pearson Studium; 50 €, 4. Auflage
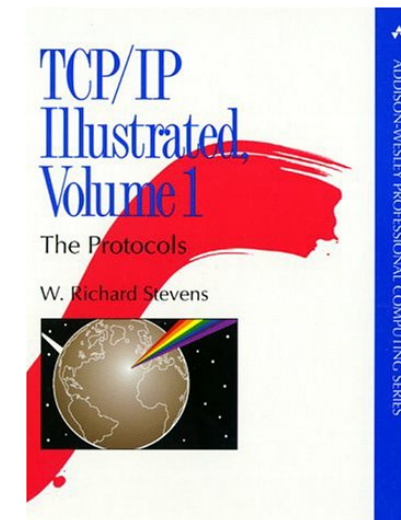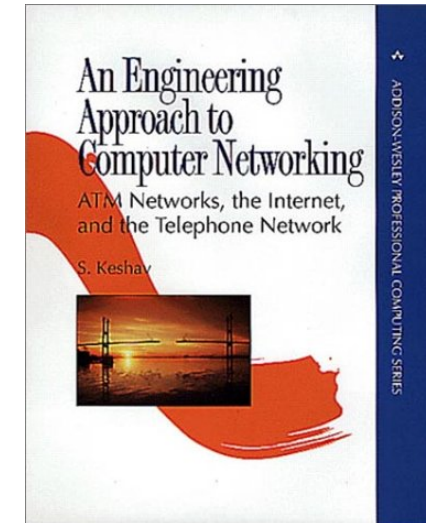    2003
    ISBN-10: 3827370469 )

# Additional relevant books

- S. Keshav: *An Engineering Approach to Computer Networking*. Addison-Wesley, 1999
  - Very good quantitative treatment of computer networks
  - Motivation of many design decisions

- W.R. Stevens: *TCP/IP Illustrated, Vol. 1- 3,* 1994, Addison-Wesley
  - Many details of the implementation of TCP/IP in BSD Unix

# Course Outline

- Part 1: Internet protocols
  - Link Layer protocols
  - Network Layer protocols
  - Transport Layer protocols
  - Application Layer protocols
- Part 2: Advanced Computer Networks Principles
  - *review:* packet-, circuit-switching
  - *common themes:* signaling, indirection, virtualization, multiplexing, randomization, scalability
  - *implementation principles:* techniques
  - *network architecture:* the big picture, synthesis
  - *network algorithmics:* self stabilization (routing examples), broadcast/controlled flooding (link state broadcast, ad hoc routing), routing and congestion control: an optimization viewpoint
  - *network simulation:* discrete event simulation, simulator ns-2
  - *performance analysis* (time permitting)