EECS 663: Introduction to Communications Networks #1

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EECS 663: Course Information

- Text: Computer Networks: Third Edition
  - Author: A. S. Tanenbaum
- Presentation notes and other course materials
  - Author: Professor Victor S. Frost
  - Some edits by Professor Joseph B. Evans
- Notes on the Web

  http://www.ittc.ukans.edu/EECS/EECS_663/
  - Current EECS 663 introductory material
  - Current homework
  - Login: EECS663 password: networks
  - Old notes

EECS 663: Course Information

- Professor: Joseph B. Evans
  - e-mail: evans@ittc.ukans.edu
  - 204 Nichols Hall, 864-4830
- Office hours
  - In 204 Nichols Hall
    - 9 AM - 11 AM Monday through Friday
    - 1 PM - 3 PM Wednesday through Friday
    - send e-mail to insure that I am available or to arrange other meeting times

EECS 663: Outcomes

- The student should be able to:
  - Discuss the basics of network protocols, access control, data link control, ATM, TCP/IP
  - Discuss the trade-offs involved in network design in a variety of environments - LAN and WAN, diverse link rates, and varied error and delay conditions
  - Discuss the layered structure of protocols
  - Discuss the importance of standards
  - Perform simple analytic performance studies
  - Perform simple simulation-based performance studies

EECS 663: Outcomes Assessment

- Class participation and discussion
- Hour exams
- Homework
- Research paper
- Semester-end course and instructor evaluations

EECS 663: Course Information

- Exams: two tests in class
- Homework: problems will be assigned and graded
- Solutions will be discussed in class
- Research Paper (No final)

EECS 663: Grading

- Two tests, each 20%
- One major network simulation project worth 20%
- Homework, miscellaneous worth 10%
- Final term paper worth 30%
  - Topic due: 9/16/99
  - Outline & references due: 10/21/99
  - Final paper due: 12/7/99

EECS 663: Grading

- Initial grading scale:
  - 90 - 100 A
  - 80 - 89 B
  - 70 - 79 C
  - 60 - 69 D
- May adjust if necessary

EECS 663: Grading

- Only under **VERY** extreme conditions will make up tests be given
- I **MUST** be notified BEFORE you miss a test otherwise you **WILL** get a zero
- No late homework will be accepted

EECS 663: POSSIBLE TERM PAPER TOPICS

- Topic Selected by: 9/16/99
- Outline & Reference due by: 10/21/99
- Term Paper due: 12/7/99
- Possible Topics
  - Internet Service Providers
  - World Wide Web
  - Digital Libraries

EECS 663: POSSIBLE TERM PAPER TOPICS

- Possible Topics (continued)
  - Survivable Networks & Protocols
  - ADSL Trials
  - Custom Hardware for Communications Networks
  - Electronic Commerce
  - VSAT/LEO/MEO/GEO Networks

EECS 663: POSSIBLE TERM PAPER TOPICS

- Possible Topics (continued)
  - Regulatory Issues
  - Network Management
  - Intelligent Networks
  - Global Information Infrastructure
  - Local Access Technologies
  - Network Security
  - Optical switching

EECS 663: POSSIBLE TERM PAPER TOPICS

- Possible Topics (continued)
  - Voice Over IP
  - Cable (TV) Modem Systems
  - Network Based Games
  - Satellite Networks
  - Broadband Wireless Networks
  - PCS
  - Optical Network Technology

EECS 663: POSSIBLE TERM PAPER TOPICS

- Possible Topics (continued)
  - Mobile Communication Networks
  - Wireless Networks
  - Photonics for Communications Networks
  - Multimedia Networks
  - Active Networks
  - **Propose your own topic**

EECS 663: References

- For fun
  - Cliff Stoll, Cuckoo's Egg, 1989
  - Bruce Egan, Information Superhighways, 1991
  - Robert Lucky, Silicon Dreams, 1991
- Periodicals
  - IEEE Communications Magazine
  - IEEE Networks Magazine
  - IEEE Transactions on Communications
  - IEEE Journal on Selected Areas in Communications
  - IEEE/ACM Transactions on Networks

EECS 663: References

- On-line: Network Bibliography
  - http://www.cs.columbia.edu/~hgs/netbib/
- Networking overviews
  - J. Walrand and P. Varaiya, High-Preformance Communication Networks,Morgan Kaufman Publishers, 1996
  - D. Comer, Computer Networks and Internets, Prentice Hall, 1997
  - L. Peterson and B. Davie, Computer Networks: A Systems Approach, Morgan Kaufman Publishers, 1996

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- Networking
  - W. Stallings, High-Speed Networks, TCP/IP and ATM Design Principles, Prentice Hall, 1998
  - S. Keshav, An Engineering Approach to Computer Networking: ATM Networks, the Internet and the Telephone Network, Addison Wesley, 1997
  - William Stallings, Data and Computer Communications, Fifth Ed. Prentice Hall, 1997.
  - J. L. Hammond and P. J. P. O'Relly, Performance Analysis of Local Computer Networks, Addison Wesley, 1986.

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- Telecommunications
  - Mischa Schwartz, Telecommunications Networks, Addison Wesley, 1987.
  - John Spragins, Telecommunications Protocols and Design, Addison Wesley, 1991.
  - Jean Walrand, Communications Networks: A First Course, 1991
  - G. Holtzman, Design and Validation of Computer Protocols, Prentice Hall, 1991.
  - S. Aidarous and Thomas Plevyak, Telecommunications Network Management into the 21st Century, IEEE Press, 1994
  - William A Shay, Understanding Data Communications and Networks, PWS Publishing Co., 1994

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- Telephony
  - J. C. Bellamy, Digital Telephony, Wiley, 1982.
  - R. L. Freeman, Telecommunications System Engineering, Wiley, 1989.
- Telecommunications Networks Queueing Theory
  - Leonard Kleinrock, Queueing Systems, Vol. I & II, John Wiley, 1975.
  - John Daigle, Queueing Theory for Telecommunications, Addison Wesley, 1991.
  - D. Gross and C. Harris, Fundamentals of Queueing Theory, John Wiley, 1985.
  - D. Bertsekas and Robert Gallager, Data Networks, Prentice Hall, 1992.

Course Outline

- Information Technology: Potential, Choices, and Problems (Notes)
- Evolution of telecommunication networks (Notes)
- Network services (Chapter 1 & 7)
- Network based applications (Chapter 1 & 7)

Course Outline

- Network traffic characterization (Notes)
  - Voice & Video
    - Micro-level, characteristics of voice signals
    - Macro-level, characteristics of voice traffic
  - Data
  - Video
  - Typical Peak Rates for Network Traffic
- Network impairments (Notes)

Course Outline

- Network technologies (Chapter 1 & 2)
  - Circuit switching
  - Message switching
  - Packet switching
  - Virtual Circuit Switching
- Network standards and open systems (Chapter 1)
- Network architectures and the OSI Reference Model (Chapter 1)

Course Outline

- Introduction to network performance evaluation (Notes)
  - Basic queuing theory
  - Introduction to network simulation
- Telephone systems, switch architectures and signaling (Chapter 2)

Course Outline

- ISDN, SONET, and Broadband ISDN (Chapter 2, 3, 5, & 6)
  - B-ISDN
  - ATM
  - SONET
- Media Access Control (Chapter 4)
  - Media Access Control (General)
  - Polling techniques
  - Random access techniques
  - Collision Free

Course Outline

- Packet Radio
- Satellite networks
- Standards
- LAN Comparison
  - Ethernet
  - Token Ring (IEEE 802.5)
  - Token Bus (IEEE 802.4)
  - FDDI
  - DQDB (IEEE 802.6)
  - ATM

Course Outline

- Data Link Control (Chapter 3)
  - Introduction to Data Link Control, Framing
  - Introduction to error control coding
  - Error and Flow Control
    - Simple DLC Protocol
    - Advanced DLC Protocol
  - DLC Protocol Efficiency
  - Rate control
  - Standard DLC

Course Outline

- High Layer Protocols (Chapter 5 & 6)
  - Service Primitives
  - Network addressing
  - IP
  - TCP
  - Routing and congestion control
  - Frame Relay
- Network Security (Chapter 7)
- An Introduction to Optical Networking (Notes)