

# 2110795 Advanced Topics in Computer Networks

## Instructors

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## Required Readings

- K. Ross and J. Kurose, *Computer Networking: A Top-Down Approach Featuring the Internet, 3<sup>rd</sup> Edition*, Addison Wesley, 2004.
- B. Cain, S. Deering, I. Kouvelas, B. Fenner, and A. Thyagarajan. Internet group management protocol, version 3. RFC 3376, Internet Engineering Task Force, October 2002.
- D. Waitzman, C. Partridge, and S.E. Deering. Distance vector multicast routing protocol. RFC 1075, Internet Engineering Task Force, November 1988.
- S. Deering, D. Estrin, D. Farinacci, V. Jacobson, C-G. Liu, and L. Wei. An architecture for wide-area multicast routing. In Proc. ACM SIGCOMM '94 Conference: Communications Architectures and Protocols, pages 126--135, London, England, U.K., August 1994.
- J. Moy, Multicast Extensions to OSPF, Network Working Group RFC 1584, March 1994.
- T. Ballardie, P. Francis, and J. Crowcroft, "Core based trees (CBT) an architecture for scalable multicast routing," in Computer Communications Review, Proceedings of ACM SIGCOMM 93, pp. 85--95, September 1993.
- Floyd, S., Jacobson, V., Liu, C., McCanne, S., and Zhang, L., [A Reliable Multicast Framework for Light-weight Sessions and Application Level Framing](#), IEEE/ACM Transactions on Networking, December 1997, Volume 5, Number 6, pp. 784-803. An [earlier version](#) of this paper appeared in ACM SIGCOMM 95, August 1995, pp. 342-356.
- Lin, J. C., and Paul, S. RMTP: Reliable Multicast Transport Protocol. In Proc. 15th Annual Joint Conference of the IEEE Computer and Communications Societies, Networking the Next Generation (IEEE/INFOCOM'96) (San Francisco, CA, Mar. 1996), vol. 3, pp. 1414-1424.
- T. Speakman, D. Farinacci, S. Lin, A. Tweedly. "PGM Reliable Transport Protocol", INTERNET-DRAFT (working draft), August 24 1998, <http://ds.internic.net/internetdrafts/draft-speakman-pgm-spec-02.txt>.
- Christos Papadopoulos, Guru Parulkar, and George Varghese. *An error control scheme for large-scale multicast applications*. In Conference on Computer Communications (IEEE Infocom), San Francisco, California, March 1998.
- M. Weiser, "The Computer for the Twenty-First Century," Scientific American, September 1991. Pages 94-104.
- G. Forman and J. Zahorjan, "The Challenges of Mobile Computing," IEEE Computer, Vol. 27, No. 4, (April 1994), pp. 38-47.
- C. Perkins, "Nomadicity: How Mobility Will Affect the Protocol Stack," IEEE Internet Computing.
- R. Caceres and L. Iftode, "Improving the Performance of Reliable Transport Protocols in Mobile Computing Environments," IEEE JSAC, Vol. 13, No. 5, (Jun 1995), pp. 850-857.
- H. Balakrishnan, S. Seshan, E. Amir, and R. Katz, "Improving TCP/IP Performance over Wireless Networks," In Proceedings of ACM Mobicom, 1995.

- H. Balakrishnan, V. Padmanabhan, S. Seshan, and R. Katz, "A Comparison of Mechanisms for Improving TCP Performance over Wireless Links," IEEE/ACM Transactions on Networking, December 1997.
- S. Cheshire and M. Baker, "Internet Mobility 4x4," Proceedings of ACM SIGCOMM 1996.
- C. Perkins, "Mobile Networking through Mobile IP," IEEE Internet Computing, Vol. 2, No. 1, (Jan.-Feb. 1998), pp. 58-69.
- C. Perkins and P. Bhagwat, "Highly Dynamic Destination-Sequenced Distance-Vector Routing (DSDV) for Mobile Computers," In Proceedings of SIGCOMM 1994.
- D. Johnson and D. Maltz, "Dynamic Source Routing in Ad Hoc Wireless Networks", Mobile Computing, edited by T. Imielinski and H. Korth, Chapter 5, pages 153-181, Kluwer Academic Publishers, 1996.
- C. Perkins and E. Royer, "Ad hoc On-Demand Distance Vector Routing," In Proceedings of the 2nd IEEE Workshop on Mobile Computing Systems and Applications, New Orleans, (Feb. 1999), pp. 90-100.
- J. Hill, R. Szewczyk, A. Woo, S. Hollar, D. Culler and K. Pister, "System Architecture Directions for Networked Sensors," Proceedings of Ninth International Conference on Architectural Support for Programming Languages and Operating Systems, November 2000.
- C. Intanagonwiwat, R. Govindan, and D. Estrin, "Directed Diffusion: A Scalable and Robust Communication Paradigm for Sensor Networks," In Proceedings of the Sixth Annual International Conference on Mobile Computing and Networks (MOBICOM), Boston, Massachusetts, USA. August, 2000.

## Course Outline

Week	Topics
1	Network Security Part I
2	Network Security Part II
3	Multimedia Part I
4	Multimedia Part II
5	Network Management
6	Multicast
7	Reliable Multicast
8	Ubiquitous Computing
9	Wireless Transport Part I
10	Wireless Transport Part II
11	Mobile IP
12	Ad-hoc Networks Part I
13	Ad-hoc Networks Part II
14	Wireless Sensor Networks

## Grading Policy

- Final scores will be determined using the following formula: 45 +/- 5 % midterm exam and 55 +/- 5 % final exam.