EE 60554: Communication Networks

Instructor:	Prof. Martin Haenggi, 274 Fitzpatrick, `mhaenggi@nd.edu`
Lecture:	TH, 75min
Offered:	Alternate Years
Text:	Dimitri Bertsekas and Robert Gallager, *Data Networks* (2nd Ed.), Prentice Hall
	Thomas G. Robertazzi, *Computer Networks and Systems: Queueing Theory and Performance Evalution*, 3rd Ed., Springer, 2000.
	Jean-Yves Le Boudec and Patrick Thiran, *Network Calculus*, Springer, 2001.
	Available at `http://lrcwww.epfl.ch/PS_files/NetCal.htm`

Description

Review of the OSI model and TCP/IP. Introduction to queueing systems and network calculus. Network traffic modeling, M/M/1 and related queues, min-plus algebra, arrival and service curves.

Course Outline

- Review of the OSI model, TCP/IP, UDP/IP, IPv6, and Internet applications (e-mail, web).

- Fundamentals of Markov systems, queueing models and theory, stochastic traffic modeling. Little's theorem and Jackson networks.

- Network calculus: Min-plus algebra applied to network analysis. Arrival and service curves, min-plus convolution, sub-additive functions, rate functions, backlog, virtual delay, burst tolerance and leaky buckets.

Additional References

- Ingemar Kaj, *Stochastic Modeling in Broadband Communication Systems*, siam Monographs on Mathematical Modeling and Computation, 2002.

- Dimitri Bertsekas and Robert Gallager, *Data Networks*, 2nd Ed., Prentice-Hall,1992

- Srinivasan Keshav, *An Engineering Approach to Computer Networking*, Addison-Wesley, 1997

- James Kurose and Keith Ross, *Computer Networking - a Top-Down Approach Featuring the Internet*, 5th Ed., Addison-Wesley, 2010.

- James Norris, *Markov Chains*, Cambridge Series in Statistical and Probabilistic Mathematics, Cambridge University Press, 1997.

- William Stallings, *Wireless Communications and Networks*, Prentice-Hall, 2004.