

# EE 520

## Topics in Communications: Network Coding

- **Instructor:** Prof. Aditya Ramamoorthy, Coover 3222, Email: [adityar@iastate.edu](mailto:adityar@iastate.edu)
- **Course Website:** <http://www.ece.iastate.edu/~adityar/Teaching/EE520/ee520.html>
- **Class Time:** TBD.
- **Prerequisite:** Knowledge of basic probability and linear algebra. Prior exposure to coding and information theory is useful but not required.
- **Textbook:** R. W. Yeung, S-Y. R. Li, N. Cai and Z. Zhang, *Network Coding Theory*, n.o.w. Publishers, 2006.
- **Other references:** C. Fragouli and E. Soljanin, *Network Coding Fundamentals*, n.o.w. Publishers, 2006.

### Course Objectives

Network coding is a relatively new research area at the intersection of networking and information theory. The basic idea of network coding is to allow nodes in a network to compute functions of their incoming packets before transmitting them further. Thus it is more general than routing which is currently the dominant network information transfer paradigm. It turns out that the use of network coding can provably improve network throughput and robustness. The objective of this course is to understand the basics of network coding theory and its applications. We shall also attempt to briefly skim over the current research and open problems.

### Course Outline

In the first half of the course I shall introduce the basics of network coding. The list of papers on the website should serve as a good indicator of the topics to be covered. I intend on finalizing the list of topics after having an idea of the composition of the class.

I shall also be putting up a list of important papers in the area that shall be consulted from time to time. The latter half of the course shall involve presentations by students. Depending on the number of students in the class this can either be done alone or in groups of at most two. My expectation is that you read a few papers relating to some aspect of network coding and prepare and give a coherent presentation and report that demonstrates your understanding of the material. I am also open to students working on a small project if there is enough interest.

## Course Policies

There shall be no exams in this class. There might be at most one or two homework assignments. However I will be assigning reading assignments (mostly research papers) from time to time. Reading and understanding the papers will serve to significantly improve your understanding of the course material.

Each student who takes this class is expected to scribe notes in LATEX for at least one class. I shall be putting up a LATEX template on the course website.

Your grade shall be primarily based on your presentation and report, the quality of the scribed notes and class participation.

---

Please address any special needs or special accommodations with me at the beginning of the semester or as soon as you become aware of your needs. Those seeking accommodations based on disabilities should obtain a Student Academic Accommodation Request (SAAR) form from the Disability Resources (DR) office (phone 515-294-7220). DR is located on the main floor of the Student Services Building, Room 1076.

---