

Outlines of the remaining topics are enumerated below. The material to be covered in the last couple of lectures is open and I am interested in hearing your preference.

1. (1 lecture) Minimum energy per reliable bit in an AWGN channel. The natural generalization to capacity per unit cost. Suggested reading will be put up on the course web page: S. Verdú, "On capacity per unit cost", *IEEE Transactions on Information Theory*, Vol. 36(5), pp. 1019-1030, September 1990.
2. (2 lectures) Multiple Access Channel: reliable communication by two non-cooperating transmitters to a common receiver. Suggested reading: Section 14.1 and 14.3.
3. (2 lectures) Broadcast Channel: reliable communication by a single transmitter to multiple receivers. Suggested reading: Section 14.1 and 14.6.
4. (2 lectures) Lossless data compression of correlated sources: Dolby audio recording consists of up to 5 microphones recording the same audio source (say, a concert performance) at physically different locations. The current approach is to separately digitize and compress the signals recorded at each microphone. However, clearly the signals picked up by the microphones are *correlated*: after all, they are all picking up the same music. Presumably some improvement can be had by being smarter than just compressing each microphone signal separately. Here we cover a remarkable result, by Slepian and Wolf, that distributed lossless compression is possible at a total rate that is the same as if we did a joint compression of all the microphone signals at one place. Suggested reading: Section 14.4 of your text.
5. This leaves us with about 2-3 lectures. Here are some possible topics we could cover.
 - (a) *Rate-distortion* theory: this is the story of *lossy* data compression. Suggested reading: Chapter 13 of your text.
 - (b) *Information Theory for Wireless Communication*: Appropriate channel models for wireless communication and their capacities.
 - (c) *Information Theory for Wireline Communication*: Appropriate channel model for the telephone line and its capacity.