Mobile Systems
An Overview
ITS 214
Some Basics

• What is needed to run a mobile telephony system?
  • A way to organize our allotted frequencies
  • A standard to define how phones interact with the fixed transmitters
  • Phones must identify themselves to the network
  • A connection to other networks
  • A way to handle voice and various forms of data
  • A way to locate a phone when a call comes in
Organizing Frequencies

- A "cell" is a set of the available channels
Cells

- Frequencies in a cell cannot be used in a neighboring cell
- Systems must be designed to serve as many customers as possible
  - Fewer cells means more channels per cell but more chance of interference
- Systems have been designed with 5, 7, or 11 sets of channels
- Note: CDMA systems use cells but do not divide up the channels - more later.
Hand-offs

- Phone moves from one cell to another
- Phone must tune to a new channel
- System must re-route the call to the new transmitter site
- The hand off can be to another system through the inter-system connections
Incoming Calls

- Much harder than land line calls (and harder than outgoing calls)
- The system originating the call may not know that the target phone is mobile
  - In fact, that system may have no knowledge of how to locate a mobile even if it does
- The solution usually involves
  - Data bases to keep track of phone identities and locations
  - Specialized networks to get at those data bases