CS434/534 (Fall 2012) Exam: Topics

- Introduction to Wireless Networks/Mobile Computing
  - Challenges of the domain
- Basic wireless communications
  - Basic: Time and frequency domains
    - How to derive one from another
    - Meaning of operation by complex numbers
  - Modulation
    - Why modulation?
    - Modulation/demodulation techniques
      - Shifting by multiplying by \( \sin / \cos / \text{complex } e \)
      - Convolution in time = multiplication in freq
    - Digital modulation/demodulation
      - Basic shift keying as signaling function
      - Matched filter detection of signaling functions
      - Symbol wave shaping to achieve true band limit
  - Wireless channels
    - Channel complexity
    - Mobility effects: challenges as well as opportunities
  - Handle wireless channels
    - Diversity
    - Time, space, and in particular frequency (DSSS, FHSS)
    - ISI (handling self-interference due to multi path)
      - Why and basic ideas of Vertibi
      - Why and basic ideas of OFDM
- Basic mobile computing
  - Basic UI based mobile app
    - Basic concepts, in particular for Android such as why Activity, non-blocking UI handler
    - Model-View-Controller based designs, e.g.,
      - Minimal code change for views for multiple display settings
      - Publish/subscription
        - IOS observer/android broadcast receiver
    - Constructing mobile app from components
      - Android IPC using Intent
      - TinyOS/GNURadio linking/interface
  - Mobile Cloud
    - Push notification service
    - Track service
    - Code partition programming (MAUI)
  - Location based mobile app
    - Basic MapView, Overlay