# Final Exam Review - Topics

## Material Covered

The final exam will cover all of the material covered in the lectures, assignments and labs. This corresponds to selected portions of Chapters 1 through 6, 8 and 10 in the text by Rappaport (first edition) plus additional material on RF design and OFDM.

## Possible Question Topics

In addition to the possible question topics listed in the review lecture for the mid-term exam (Lecture 16), you should be able to (lecture numbers in parentheses):

- select the appropriate type(s) of diversity and combining technique(s) based on criteria such as the available number of antennas and antenna separation, available bandwidth, delay tolerance, signal dispersion in time and frequency and cost (12)
- do computations for a cellular system relating the number of channels, the reuse factor, and the cluster size (13)
- compute the SIR for a given reuse factor and path-loss vs distance relationship (13)
- explain how system capacity is increase by cell splitting and how user mobility is handled through handoffs (13)
- compute the bit error rate in either AWGN or Rayleigh fading for M-QAM, BPSK/QPSK/MSK, NC-FSK and GMSK (14)
- compute the packet error rate from the bit rate (assuming independent bit errors)
- compute traffic intensity in Erlangs, determine if the Erlang B formula is appropriate and compute the blocking probability using by using graphs or evaluating equations (15)
- draw a block diagram of an RF processing chain that amplifies/attenuates a signal, separates it from nearby signals and shifts it to a different frequency or complex baseband (17)
- compute the output signal levels and frequencies of third-order intermodulation products based on the IIP3 or OIP3 specifications of a device and the input signal levels and frequencies (17)
- compute the cascade IP3 and noise figure (or equivalent noise temperature) given the gain and IP3 specfications of devices in the cascade. (17)
- select a receiver architecture and design a receiver to meet given specifications (19, 20, Lab 6)
- distinguish between duplexing and multiple access, and between full- and half-duplex (21)
- select appropriate multiple access technique(s) based on requirements such as duplexing, availability of paired spectrum, cost and spectral efficiency and the characteristics of the data source such as random vs isochronous (21)
- distinguish between block and convolutional codes, compute Hamming distance, code rate, coding gain, and constraint length (22)
- compute output for a convolutional coder given the encoder schematic, initial state and puncturing pattern (22)
- perform computations for OFDM relating symbol period, sample rate, block size (23)
- select OFDM cyclic extension duration based on channel impulse response and select subcarrier frequency range based on channel frequency response (23)