EE354 Study Guide for Final Exam

Basic Oscilloscope

- Use the LeCroy Oscilloscope to observe a signal in the time domain with appropriate settings for sampling frequency and number of points.
- Use the markers or measurement features of the scope (in the time domain) to measure time, frequency, peak amplitude, or RMS amplitude.
- Use FFT function to observe the frequency content of the signal.
- Use the markers (in the frequency domain) to measure frequency, power, and bandwidth.
- Capture/save trace data, download to a PC, and generate/printout a meaningful plot via Matlab.

Basic Spectrum Analyzer

- Use the Anritsu Spectrum Analyzer to observe a signal in the frequency domain with appropriate settings for frequency range, bandwidth, and reference level.
- Use markers to measure frequency, bandwidth, and power of a signal.
- Use the spectrum analyzer to confirm frequency, bandwidth, and power measurements made by the oscilloscope.
- Capture/save spectrum sweeps, download to PC, and generate a printout of the recorded data.

Baseband Signals

- Identify the different types of digital signaling (Polar/Bipolar, RZ, NRZ) using either an oscilloscope or spectrum analyzer.
- Determine data rate and data sent (1's and 0's).
- Record/capture power spectrum of baseband signal.

Amplitude Modulation

- Identify an AM modulated signal using either an oscilloscope or spectrum analyzer.
- Determine: carrier frequency, modulation frequency, modulation index, and efficiency.
- Record/capture both time domain and frequency domain plots of the AM signal.
- Successfully demodulate the AM signal and recover the original information using Matlab.

Amplitude Shift Keying

- Identify an M-ary ASK signal using either an oscilloscope or spectrum analyzer.
- Determine: carrier frequency, data/symbol rate, and M.
- Record/capture both time domain and frequency domain plots of the ASK signal.
- Using the oscilloscope, visually decode the bits/symbols of an ASK signal.
- Successfully demodulate an OOK signal and recover the original bits using Matlab.

Frequency Modulation

- Identify an FM modulated signal using either an oscilloscope or spectrum analyzer.
- Determine: carrier frequency, modulation frequency, frequency deviation, and β.
- Record/capture both time domain and frequency domain plots of the FM signal.
- Successfully demodulate the FM signal and recover the original information using Matlab.

Frequency Shift Keying

- Identify an M-ary FSK signal using either an oscilloscope or spectrum analyzer.
- Determine: symbol frequencies, data/symbol rate, and M.
- Record/capture both time domain and frequency domain plots of the FSK signal.
- Using the oscilloscope, visually decode the bits/symbols of a FSK signal.
- Successfully demodulate a 2-FSK signal and recover the original bits using Matlab.

Phase Shift Keying

- Identify an M-ary PSK signal using either an oscilloscope or spectrum analyzer.
- Determine: carrier frequency, data/symbol rate, and M.
- Record/capture both time domain and frequency domain plots of the PSK signal.
- Successfully demodulate a BPSK signal and recover the original bits using Matlab.