Communication Systems
(ECE4572)
Fall 2013

Homework 1
Assigned Sept. 5, due Sept. 11.

1. List five important events in the history of communications.

2. Define the role of transmitter, channel, and receiver in a communication system. Name a few distortions that a channel can introduce.

3. Explain why is it necessary in some systems to modulate the information-bearing signal onto a carrier.

4. If an information-bearing signal $u(t)$ modulates the amplitude of a carrier of frequency f_c, specify the modulated signal $s(t)$. Prove that the spectrum (Fourier transform) of the modulated signal is given by $S(f) = \frac{1}{2}U(f - f_c) + \frac{1}{2}U(f + f_c)$, where $U(f)$ is the spectrum of the signal $u(f)$. Assume that the signal $u(t)$ is real-valued. As a side, can you also prove that $U(-f) = U^*(f)$?

Provide your answers in single-page typed report. Please make sure to put your name on top of the page, below the title.