

## ECE435: Network Engineering – Homework 1

**Due: Wednesday 7 September 2016, 3:00PM**

For this homework short answers will suffice.

To submit, create a document with your answers (text, pdf, libreoffice, MS Office if you must) and e-mail them to *vincent.weaver@maine.edu* by the homework deadline. Title your e-mail “ECE435 Homework 1” and be sure your name is included in the document.

1. In the OSI reference model, which layer deals with the actual bits, voltages and frequencies involved?
2. You have a network connection where the signal to noise (S/N) ratio is 500. What is this equal to in dB? (HINT:  $dB = 10\log\frac{S}{N}$ )
3. You have a connection with 100MHz of bandwidth and 14dB S/N ratio. What's your maximum transmission speed predicted by the Shanon theorem? (HINT:  $bps = H\log_2(1 + \frac{S}{N})$ , where H is bandwidth)
4. Name two benefits fiber optics have over copper wire.