

## **ECE401 Project 1: AM Quadrature Multiplexing Using MATLAB**

### **This project involves the use of MATLAB to simulate an AM with Quadrature Multiplexing (IQ Modulation)**

Modify the provided MATLAB code (AM3\_students.m) to demonstrate that quadrature multiplexing works. Specifically, generate a second independent message signal and a second quadrature carrier (i.e., sin instead of cos). Modulate one message with one carrier and the second message with the quadrature carrier. Next add these two modulated signals to generate what looks like the signal that enters the receiver antenna. Take this summed modulated signal (i.e., the receiver signal) and demodulate it with two channel coherent demodulation. That is mix the receiver signal with the regular carrier in one channel and the quadrature carrier in the other channel. Finally low pass filter each channel to get the demodulated signals. Plot the demodulated signals together with the corresponding message signal to show that they are almost identical. This can be done in a manner similar to what is already provided (you just need two plots). Plots of other intermediate results are fine as well (e.g., periodogram for the power spectral density estimates and such), but are not strictly required.

Use cell arrays and lots of comments to organize your code. Then publish the script file you created to a .pdf file using MATLAB publish feature. In the MATLAB editor, select File→Publish Configuration for <File Name> → Edit Publish Configuration, and set the “Output file format” to .pdf. Then select File→Publish <File Name>. Upload the .pdf to Isidore. The published code should show the complete code and results and should run without error.