Second Programming Assignment on OFDM

Task 1: Implement the following tasks on MATLAB

1. Pick an image of your choice
2. Convert the image to bits
3. Modulate the bits encoded frame using BPSK and QPSK
4. Generate a sequence of N-carrier OFM symbols against a channel with the following power delay profile (PDP) where N = 16, 32, 64.
    a. PDP = [1 0.3]
    b. PDP = [1 0 0 0.3]
    c. PDP = [1 0.2 0.1]
5. Transmit the OFDM modulated symbols over a frequency selective channel with the above PDPs
6. Demodulate the OFDM symbols
7. Decode the bits
8. Plot the bit error rate of this scheme as a function of several signal to noise ratio

Task 2:

1. For the channels with PDP given in step 4 of the previous task, empirically compute the covariance matrix between the frequency domain channels.
2. Verify the above result by theoretically computing the covariance matrix for the above PDPs
3. Which PDP in the above task offers the worst error performance, and why?

The entire code in MATLAB along with the results must be uploaded and demonstrated before the instructor