Digital Image Processing

Fall 2021

**Assignment #3**

**Fourier Spectrum and Lowpass Filtering in Frequency Domain**

(a) Download Fig. 4.41(a) from the book web site and compute its (centered) Fourier spectrum.

(b) Display the spectrum.

(c) Implement the Gaussian lowpass filter in Eq. (4.8-7). You must be able to specify the size, M x N, of the resulting 2D function. In addition, you must be able to specify the location of the center of the Gaussian function.

(d) Download Fig. 4.41(a) from the book web site and lowpass filter it to duplicate the results in Fig. 4.48.

**Swapping Magnitude and Phase**

(a) Compute FFT of Fig0424(a) and Fig0427(a) respectively.

(b) Display the spectrum and phase angle.

(c) Reconstruction by combining the magnitude of Fig0424(a) and the phase of Fig0427(a).

(d) Reconstruction by combining the magnitude of Fig0427(a) and the phase of Fig0424(a).

(e) Display reconstructed images.