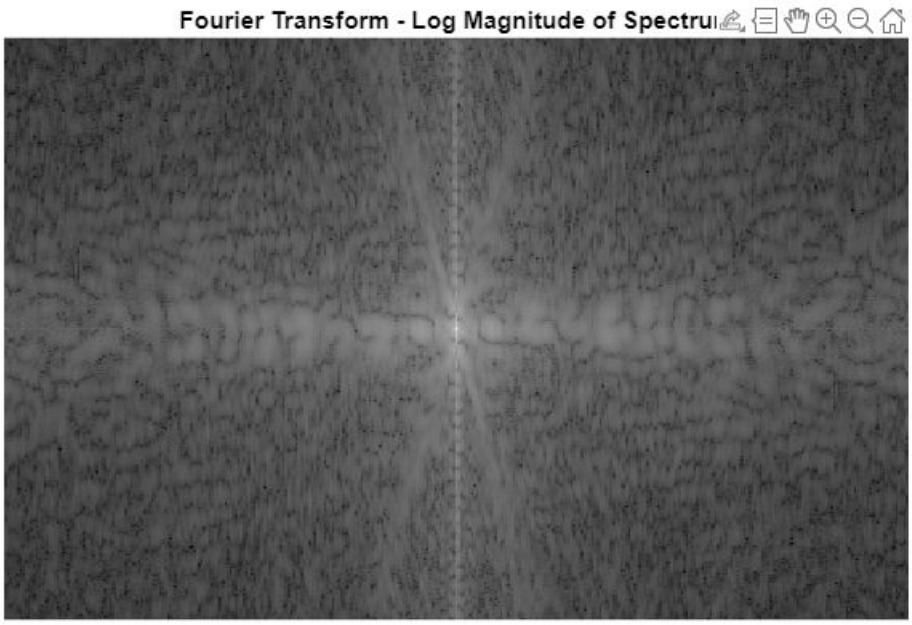
```
clear all;
img = imread('/MATLAB Drive/IMG_3411.JPG');
grayImage = rgb2gray(img);

figure;
imshow(grayImage)
title('Original Image')
```


```
% Compute the 2D Fourier Transform
fourieTransformImage = fftshift(fft2(double(grayImage)));

figure;
imshow(log(1+abs(fourieTransformImage)),[]);
title('Fourier Transform - Log Magnitude of Spectrum')
```




```
sigma = 20; % Standard deviation
n = 2; % Order for Butterworth

[rows, cols] = size(grayImage);
% meshgrid for frequency domain coordinates
[u, v] = meshgrid(-cols/2:cols/2-1, -rows/2:rows/2-1);

% distance from the origin in frequency domain
D = sqrt(u.^2 + v.^2);

% Butterworth filter in the frequency domain and inverse Fourier Transform
butterworthFilter = 1 ./ (1 + (D ./ sigma).^(2*n));
butterworthFilterImage = uint8(abs(ifft2(ifftshift(fourieTransformImage .*
butterworthFilter))));

% Gaussian filter in the frequency domain and inverse Fourier Transform
gaussianFilter = exp(-(u.^2 + v.^2) / (2*sigma^2));
gaussianFilter = gaussianFilter / sum(gaussianFilter(:));
gaussianFilterImage = abs(ifft2(ifftshift(fourieTransformImage .*
gaussianFilter)));


figure;

subplot(1, 2, 1);
```

```
imshow(butterworthFilterImage);
title("Butter Worth Filter Image");

subplot(1, 2, 2);
imshow(gaussianFilterImage,[]);
title("Gaussian Filter Image");
```