```
clc;
clear all;
close all;

% Original band-limited signal
Fs = 1000;            % High sampling frequency
t = 0:1/Fs:1;         % 1 second duraTIon

x = sin(2*pi*50*t) + sin(2*pi*150*t);
% Max freq = 150Hz (Nyquist => ≥ 300Hz)

% N-point sampling values to verify sampling theorem
N_values = [50, 100, 200, 500];   % Small to large sample sizes

figure;
for j = 1:length(N_values)

    N = N_values(j);

    % Take first N sample points (sampling in Tme)
    xn = x(1:N);

    % Compute FFT (Circular convolution style spectral analysis)
    Xk = fft(xn, N);

    % Frequency axis
    freq = (0:N-1) * (Fs/N);

    % Magnitude spectrum plot
    subplot(length(N_values), 1, j);
    stem(freq, abs(Xk));
    grid on;
    xlabel('Frequency (Hz)');
    ylabel('|X(k)|');
    title(['Spectrum for N = ' num2str(N)]);

end

sgtitle('Sampling Theorem Verification using Circular Convolution (FFT)');
```

Sampling Theorem Verification using Circular Convolution (FFT)