Assignment 9

You are to design a digital filter to perform the given task. As per your lecturer's instructions, you must not use any built-in MATLAB functions or libraries. You are required to submit both a handwritten and a MATLAB code version of your solution.

Due: 23/01/2023

Task: Design a digital filter to perform the following task:

1. Remove the low-frequency noise from a signal.
2. Filter out frequencies below 10 Hz and above 1000 Hz.
3. Apply a window function to the resulting signal.

Specifications:

- Sampling frequency: 1000 Hz
- Lower frequency limit: 10 Hz
- Upper frequency limit: 1000 Hz
- Window function: Hanning

Your code should include the following:

- A filter design function that implements the above specifications.
- A plot of the magnitude response of the designed filter.
- A plot of the phase response of the designed filter.
- A plot of the frequency response of the designed signal before and after filtering.
- A plot of the time-domain response of the designed signal before and after filtering.

You are not allowed to use any built-in MATLAB functions or libraries for the above tasks. You must implement the entire solution from scratch.

Best of luck!