A novel all-pass-based infinite impulse response (IIR) digital multiple-notch filter design method is presented in this paper. The proposed method ensures that, for an arbitrary pass-bands ripple value, specifications regarding positions of notch, left- and right-hand cutoff frequencies are exactly met, which leads to symmetric magnitude responses about notch frequencies. Although iterative in its nature, proposed method requires a small number of iterations to find coefficients of the multiple-notch filter, making it very useful for designers. Since the magnitude response of the all-pass-based IIR multiple-notch filter is more sensitive in the stop-bands than in the pass-bands, sensitivity analysis along with simulation in limited word-length environment is performed.