

# Circuits II

EE221

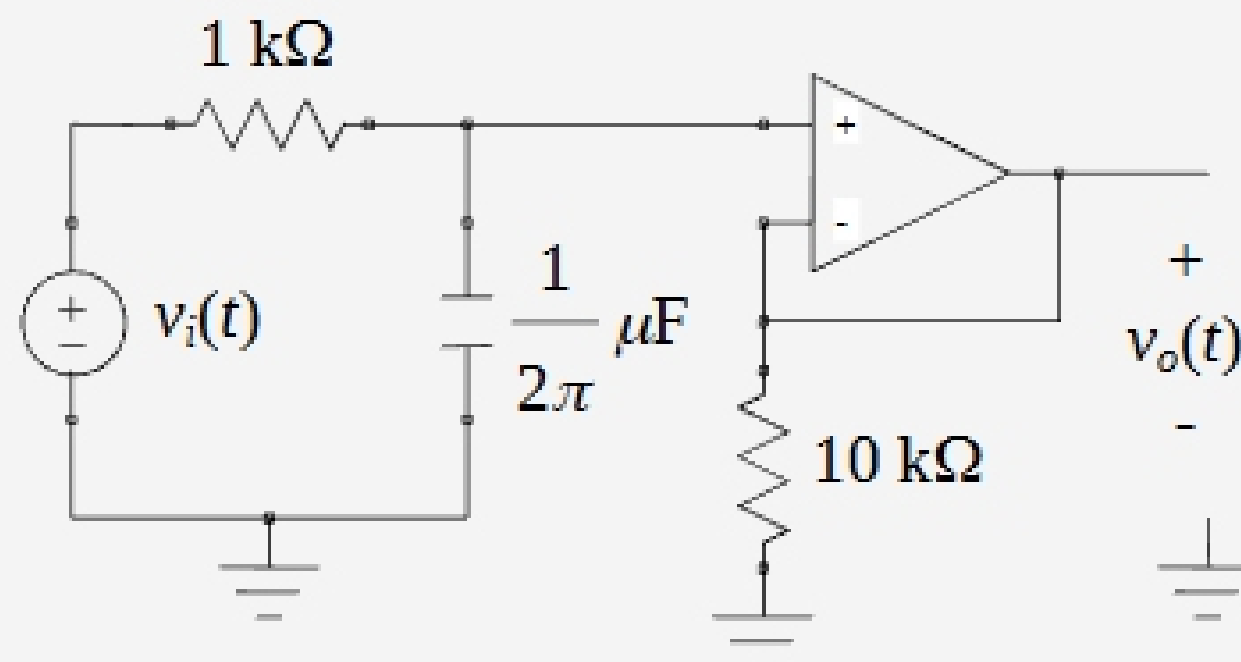
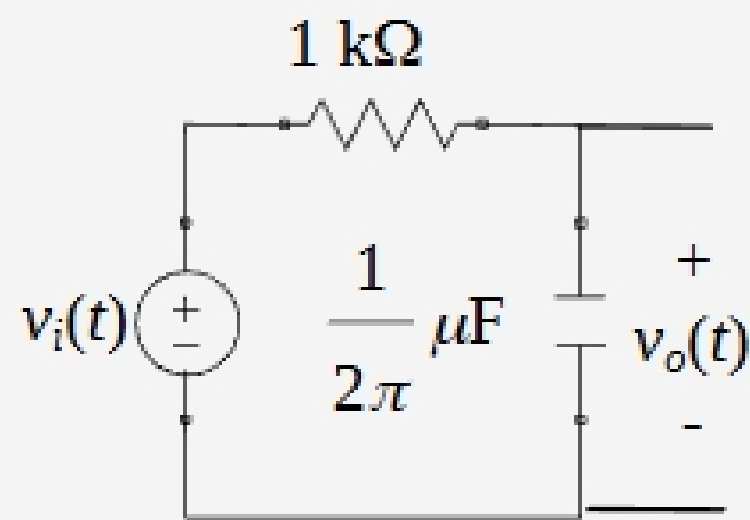
Unit 6

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Active Filters, Connections of Filters, and  
Midterm Project

# Load Effects

- If the output of the filter is not buffered, then for different loads, the frequency characteristics of the filter will change.
- **Example:** Both low-pass filters below have  $f_c = 1$  kHz and  $G_{DC} = 1$  (or 0 dB).



- **Find:**  $f_c$  and  $G_{DC}$  when a  $100\text{ }\Omega$  load is placed across the output  $v_o(t)$ .

- **Result:**  $f_c = 11$  kHz and  $G_{DC} = 1/11$  (or -21 dB) for the passive

# Filter Order

- The order of a filter is the order of its transfer function (highest power of  $s$  in the denominator). If the filter order is increased, a sharper transition between the stopband and passband of the filter is possible.
- **Example:** For the two low-pass filters, determine circuit parameters such that  $f_c$  is 100 Hz, and  $G_{DC} \approx 1586$ . Plot transfer function magnitudes to observe the transition near  $f_c$ .

