EE316 Electronics Design

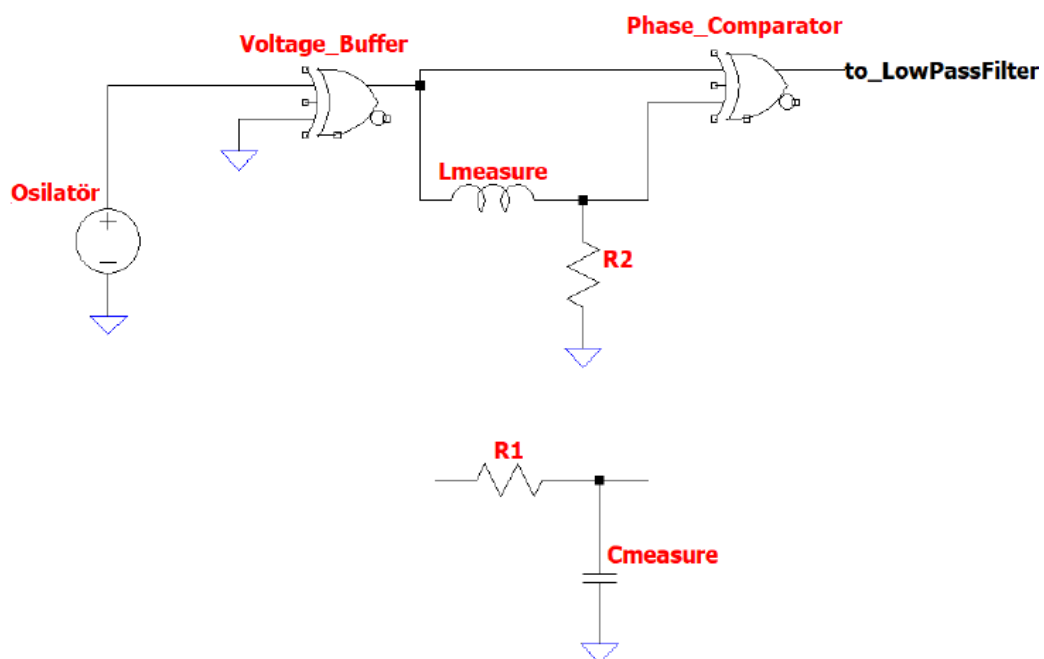**LC Meter Project Design**

To design an LC meter to measure capacitance and inductance values in the specified range with an accuracy of ±2%, you can follow these steps:

- Choose a suitable **square wave oscillator** circuit with a frequency range that covers the desired measurement range of capacitance and inductance. One possible option is the 555 timer IC based oscillator.
- Design an RC circuit with a known resistance and capacitance that can be switched in parallel with the unknown capacitor. The RC circuit should form a low-pass filter with a cutoff frequency higher than the oscillator frequency but lower than the expected frequency of the unknown capacitance. The **cutoff frequency should be chosen such that it allows the circuit to measure the capacitance accurately**. Use a variable capacitor for calibration of the RC circuit.
- The RL circuit should form a high-pass filter with a cutoff frequency lower than the oscillator frequency but higher than the expected frequency of the unknown inductance. The cutoff frequency should be chosen such that it allows the circuit to measure the inductance accurately. Use a variable inductor for calibration of the RL circuit.
- Use a **phase comparator** to measure the phase difference between the oscillator signal and the signal across the RC or RL circuit.
- Use a **low-pass filter** to remove high-frequency noise and harmonics from the phase difference signal.
- Design **amplifier circuit** to adjust precisely the low-pass filter output.
- Convert the analog signal from the low-pass filter to a digital signal using an ADC. proteus
- Calibrate the LC meter using known capacitance and inductance values to ensure an accuracy of ±2%.
- Develop an **extension feedbak design** circuit in the case of noisy measurements.

Phase -1 of LC Meter Project