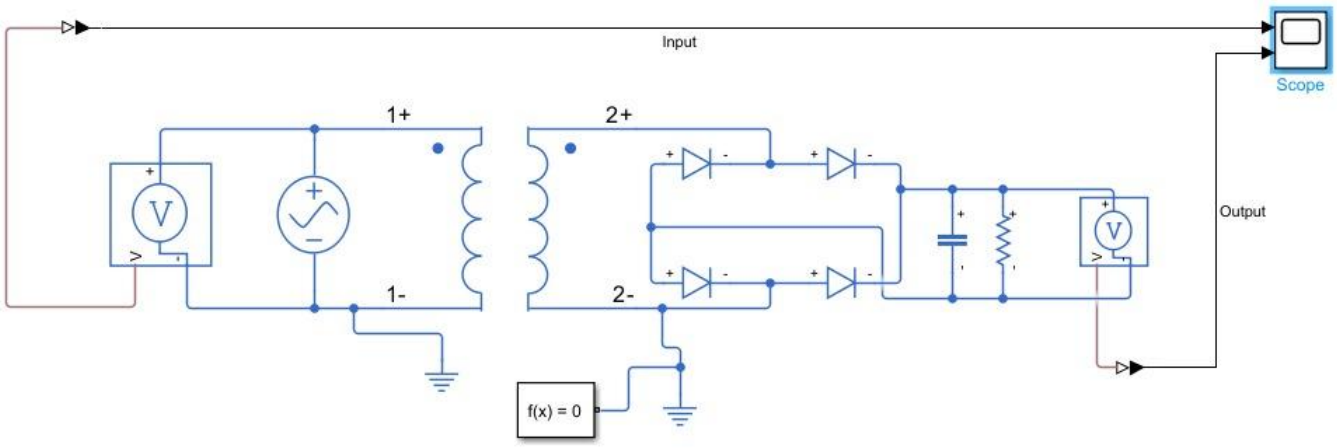
# Team – 02

# DC Power Supply

## 1 – Simulation Part

In the simulation part, we built a full-wave bridge rectifier.

The circuit consists of an AC source, a step-down transformer, a bridge rectifier, and a filter capacitor that regulates the voltage supplied to the load.



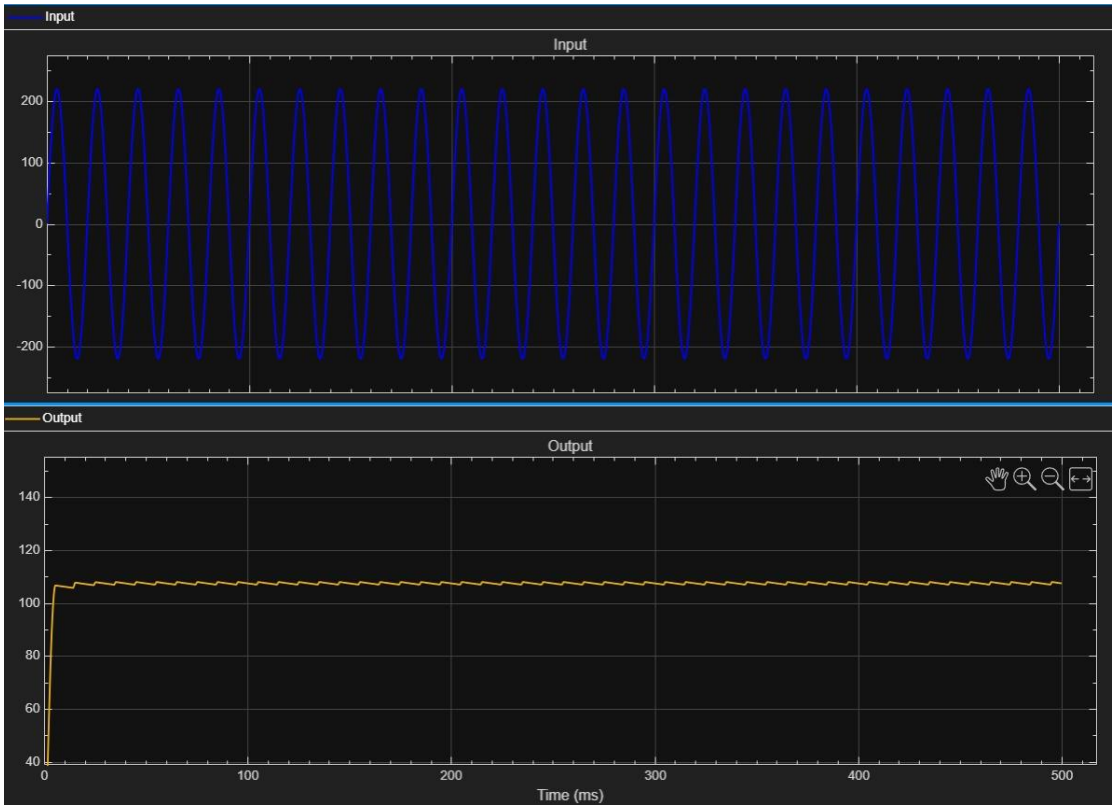

Vs = 220 V

Transformer ratio = 2:1

Capacitance = 1000 µF

Frequency = 5 Hz

Resistor = 1 kΩ




The figure shows the input and output waveforms.

The peak of the input voltage is 220 V.

The peak voltage on the secondary coil can be calculated:

Vp_secondary = V_primary / turns ratio

So, Vp_secondary = 220 / 2 = 110 V

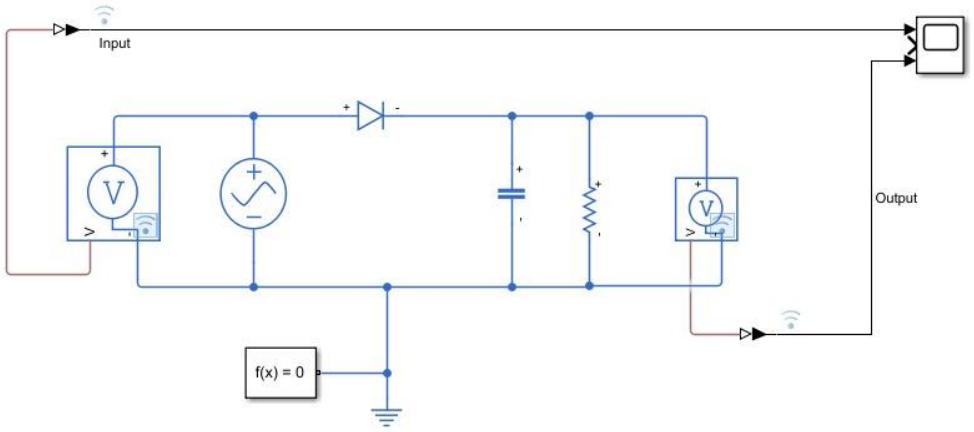
The peak output voltage:

Vp_out = Vp - 2Vd = 110 - 2*0.7 = 108.6 V

Ripple voltage:

Vr = Vp / (2 f R C) = 10.86 V

## 2 – Lab Part




The figure shows the circuit we built in the lab.

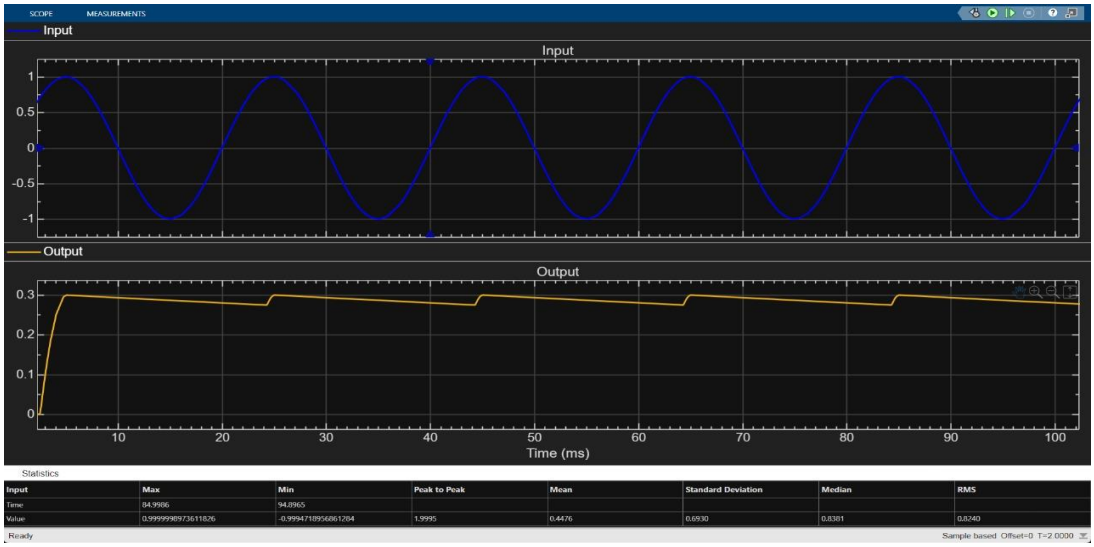
We used an **AC sinusoidal** power supply, a **1N4007** diode, a capacitor, and a resistive load.

AC source peak voltage = 1 V

Capacitance = 220 µF

Frequency = 50 Hz

Resistor = 1 kΩ




Peak output voltage:

Vp_out = Vp – Vd = 1 - 0.7 = 0.3 V

Ripple voltage:

Vr = Vp / (f R C) = 0.02727 V

# Results

**We faced noise in the lab output, so the measurements were not very accurate.**

**The problem may have occurred due to either the breadboard or the probe's ground connection. We suspected an issue with the breadboard because we faced a similar situation where the input signal looked clean when measured directly from the source but showed a cutoff at the peak of the sine wave when measured through the breadboard. We also considered the probe's ground as a possible cause, since the noise in the output waveform suggests that the circuit might not have been properly grounded.**

Measured peak output voltage: 0.387 V

Measured Vr: 0.03458 V

Error in peak output voltage: 29%

Error in Vr: 26.8%

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