

# ECTE250

## ENGINEERING DESIGN AND MANAGEMENT 2

**Winter 2025 / Spring 2025**

**Power Analysis**

# Project Requirements & Constraints

- Each team can use one and only one **dual supply power supply** which can deliver at most **150mA on +15/-15Volt rails**.
  - This has to power minimum two and maximum eight **operational amplifiers**.
- The design must include at least one **Voltage Regulator**, used to power circuits that require a supply of 5V or 3.3V.
  - E.g. generate 5V from 15V supply, or generate 3.3V from 5V supply.
- The Arduino Board and the Ethernet Shield are powered by the USB cable connected to a Computer (or to a USB charger).
  - The LCD display can be powered by the 5V or 3.3V available on the Arduino header.

# Project Requirements & Constraints

button on /  
pushed

(i.e. series configuration)

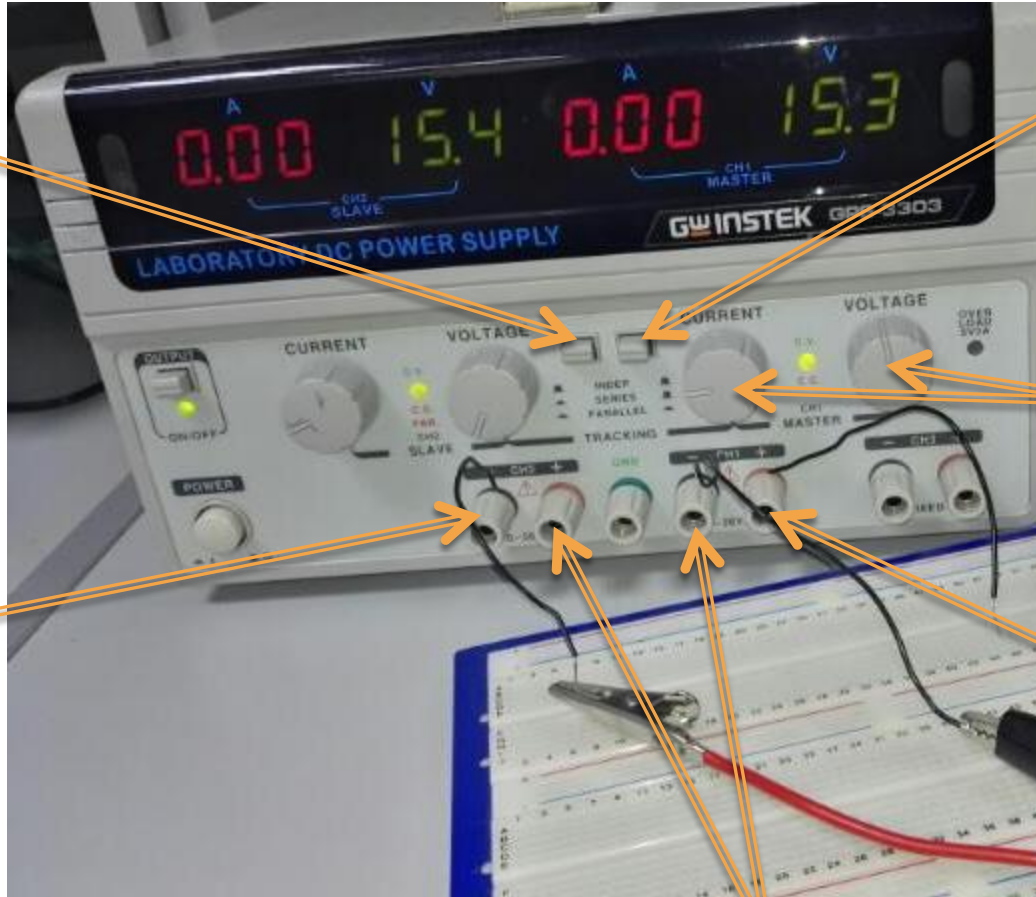
button off /  
released  
(i.e. series configuration)

Set the Voltage  
and Max current  
using these only

-15 V

+15 V

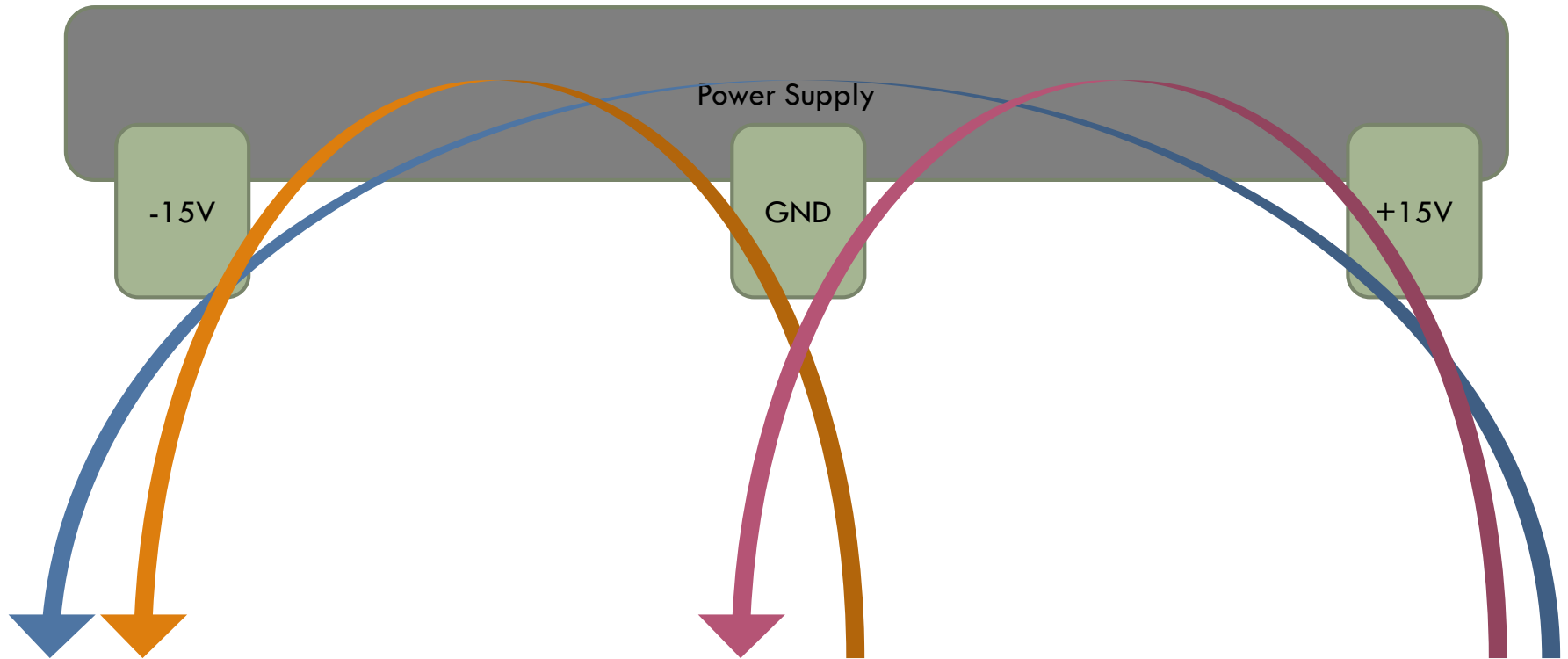
Any one of this can be used as Ground (Use only one)



# Project Requirements & Constraints

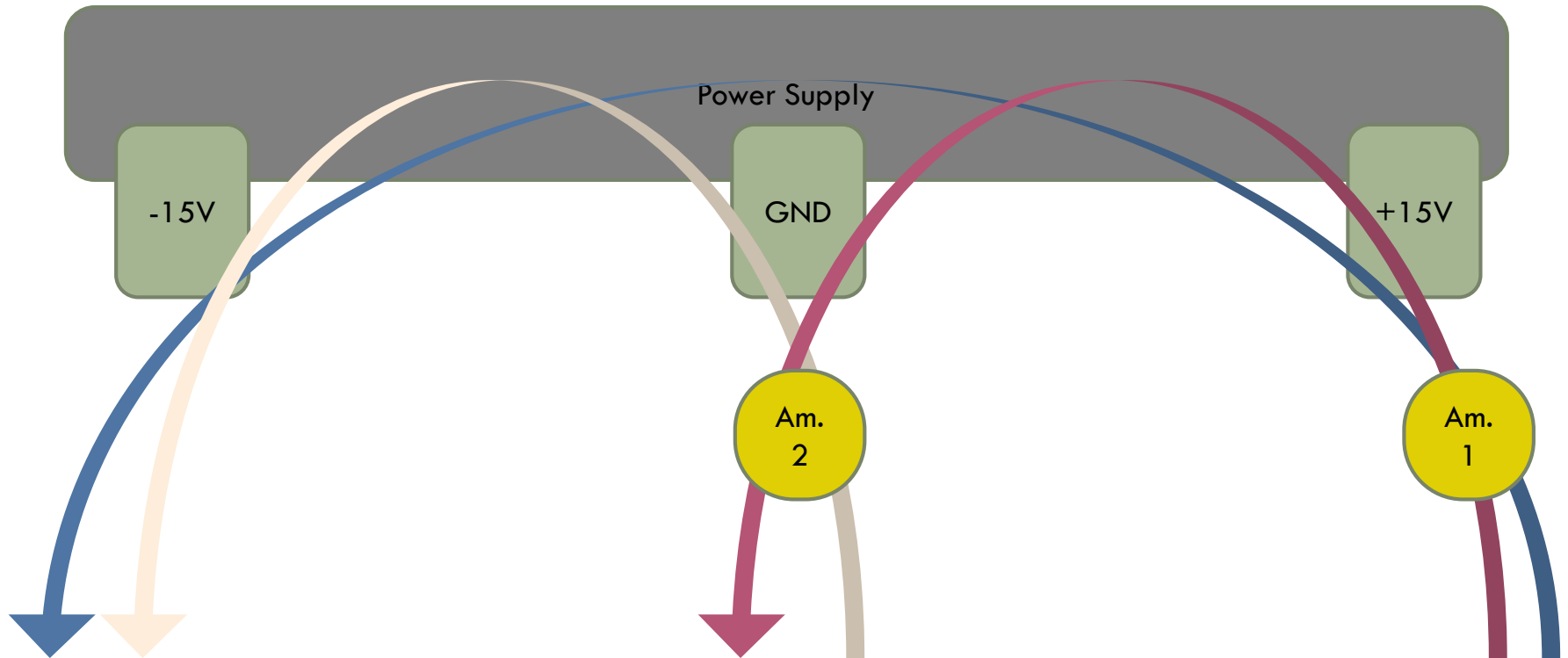
- The total power consumption over a representative operational cycle had to be measured and analyzed (for each state of the State Machine).
- Team projects will be subject to a maximum power constraint but a main judging criteria will be on the minimum power consumption of the system over a representative operational cycle.
- To save power you can use multiplexers and small low voltage relays to make the circuits 'time division multiplexed' if you wish.
- The Arduino sub-system (including Ethernet shield and LCD display) are not to be included in the power analysis.

# Project Requirements & Constraints



- $P = V \times I$
- For the power analysis you may have to measure 3 current flows:
- Blue (from +15 to -15), Orange (GND to -15), Red (+15 to GND).

# Project Requirements & Constraints



- Assume that the Orange current is 0.
- Use two Ammeters and solve a linear system of 2 equations with 2 variables.