

SCN 147 EE I Circuits to Robots

Final Day

Yue Cao

Syracuse University EECS

Electrical Engineering Knowledge Built-up

- ❑ **Instrument usage:** breadboard, multimeter, function generator, oscilloscope
- ❑ **Circuit Simulation:** LTSpice
- ❑ **Circuit Analysis:** Ohm's law, series & parallel circuit
- ❑ **Overview and Scope of Electrical Engineering study:**
 - Analog EE: MCP6022 Op-Amp Circuit
 - Digital EE: Ultrasonic sensor, SN74LS08N Logic gate
 - Signal Processing: RC filter circuit, FFT spectrum inspection
- ❑ **Scientific Computation:** Google Colab with numpy, matplotlib

The Robot

- ❑ ELEGOO UNO R3 Smart Robot Car Kit V4 (with Camera)
- ❑ Item link: <https://us.elegoo.com/products/elegoo-smart-robot-car-kit-v-4-0>
- ❑ Code download: <https://www.elegoo.com/blogs/arduino-projects/elegoo-smart-robot-car-kit-v4-0-tutorial>

Extra

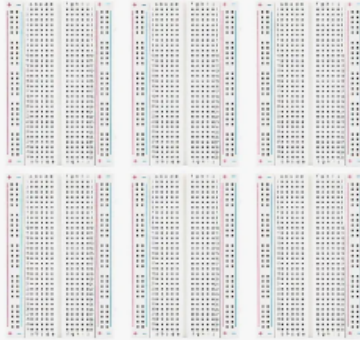
How to Set Up a Small EE Lab at Home

❑ Basic tools: multimeter, breadboard, jumpwire

Overall Pick



KLEIN TOOLS
MM325 Multimeter, Digital Manual-
Ranging 600V AC/DC Voltage
Tester, Tests Batteries, Current,
Resistance, Diodes, and Continuity
#1 Top Rated
4.7 ★★★★★ (2.8K)
3K+ bought in past month
\$34⁹⁷



ELEGOO
6PCS 400 Point Breadboard Kit Solderless Breadboards
Electronics for Circuits PCB Prototype Board
4.6 ★★★★★ (221)
500+ bought in past month
\$8⁹⁹ (\$1.50/count)
[Join Prime](#) to get FREE delivery **Sun, Jul 19**
Or Non-members get FREE delivery **Thu, Jul 23** on \$35 of items shipped by Amazon
[Add to cart](#)

Overall Pick



**ELEGOO 120pcs Multicolored
Dupont Wire 40pin Male to Female,
40pin Male to Male, 40pin Female
to Female Breadboard Jumper...**
4.8 ★★★★★ (14.9K)
5K+ bought in past month
\$6⁹⁸

Extra

How to Set Up a Small EE Lab at Home

❑ Measurement instrument: Analog Discovery



Analog Discovery 3: 125 MS/s USB Oscilloscope, Waveform Generator, Logic Analyzer, and Variable Power Supply

\$379.00

★★★★★ (10 reviews) [Write a Review](#)

SKU: 410-415

Purchase from one of our distributors listed below:

	DigiKey	Global	343 in stock	Buy Now
	Mouser Electronics	United States	253 in stock	Buy Now
	RS UK	United Kingdom	37 in stock	Buy Now

Extra

How to Set Up a Small EE Lab at Home

- ❑ Development board:
 - Microcontroller (from Beginner to Advanced)
Arduino, ESP32, STM32
 - Single board computer:
Raspberry Pi, Nvidia Jetson Nano

Extra

Vendors for Fun, Beginner-Friendly Electronics:

- ❑ Adafruit
(my personal recommend, often comes with guide in articles,
example: <https://www.adafruit.com/product/4502>)
- ❑ SparkFun
- ❑ Seeed Studio
- ❑ ...

Extra

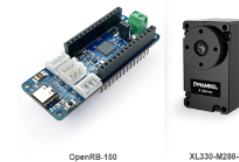
If you want to build a small robot arm project

- ❑ ROBOTIS Co., Ltd.
<https://www.robotis.us/>
Their servo motors are good.
- ❑ I use their kits for college robotics course.
- ❑ Students' demo from my class:
<https://youtu.be/XolKez2Vb-A>
(chess play)
<https://youtu.be/nfLKo9IjqFw>
(speech controlled pick-up)

Control Mode Note

XL330 models support up to 6 control modes, including Current Control and Current-Based Position Control. > current-control modes, but they remain a strong choice when higher torque is needed at a lower cost.

OpenRB-150 Starter Kit



OPENRB-150 STARTER KIT



\$52.79

[ADD TO CART](#) >>

☐ Compare



DYNAMIXEL XL330-M288-T



\$27.49

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☐ Compare



DYNAMIXEL XL330-M077-T



\$27.49

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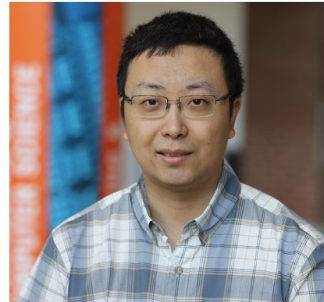
☐ Compare

People you met

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EE Material Lab

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Hint on Arduino Coding

Field Trip: INFICON Inc., East Syracuse



Two More Things!

- ❑ Uninstall the software that you won't use.
Save your disk space.
(for example: WaveForms, LTSpice, ...)
- ❑ Finish course survey
use this QR
Or visit <http://coursefeedback.syr.edu/>
- ❑ Once done, I have some small breadboards
as your gift

