

Title: Bill of Materials  
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Item No.	Component Name	Description	Qty	Unit Cost (USD)	Total Cost (USD)
1	Microcontroller IC	STM32 or equivalent MCU (TQFP package)	1	5	5
2	Power Supply Transformer	120V AC to 12V DC transformer module	1	12	12
3	Buck Converter Modules	12V to 5V and 3.3V converters	2	4.5	9
4	MOSFETs	Logic-level N-channel (e.g. IRLZ44N)	6	1.2	7.2
5	LED Array	12V LED grow light strips	1	15	15
6	Peristaltic Pumps	12V mini pump for nutrient/water delivery	2	8	16
7	EC Sensor	Analog electrical conductivity probe	1	10	10
8	pH Sensor	Analog pH sensor module	1	13	13
9	Temperature Sensor	Analog or digital (e.g. NTC or DS18B20)	1	3	3
10	LCD Display	16x2 or 20x4 character display	1	6	6
11	Capacitors & Resistors	Mixed values for filtering, biasing, etc.	30	0.1	3
12	Op-Amps	Signal conditioning (e.g. LM358 or TL074)	2	1	2
13	ADC IC (optional)	External ADC if higher resolution is needed	1	4	4
14	PCB Fabrication	Custom PCB for MCU, power, and sensors	2	20	40
15	Connectors & Terminals	Screw terminals, headers, wire connectors	15	0.5	7.5
16	Enclosure & Mounting	Acrylic or plastic box for housing components	1	10	10
17	Fan	12V cooling fan for thermal control	1	5	5

## **Vendor / Source**

Digi-Key

Digi-Key / Amazon

Amazon / eBay

Mouser / Digi-Key

Amazon

Amazon / AliExpress

eBay / DFRobot

Amazon / DFRobot

Amazon / Digi-Key

Amazon / Adafruit

Digi-Key / Mouser

Digi-Key / Jameco

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JLCPCB / OSH Park

Amazon / Digi-Key

Amazon / Home Depot

Amazon / eBay