

Humanoid Lab Equipment

Please provide quotation at best possible rates for following equipment on or before 30.11.2025 via email at: pa2director@thdcihet.ac.in

Sno.	Equipment	Specification	Quantity
1	Raspberry Pi 4 Model B 4GB Budget Kit	• Quad-Core Processor (1.5GHz): Fast performance with improved processing power. • Dual 4K HDMI Output: Supports dual 4K displays for enhanced multimedia. • 4GB RAM: Provides smooth multitasking and faster app performance. • USB-C Power Input: Ensures stable power supply with 5V, 3A input. • Wi-Fi & Bluetooth 5.0: Fast wireless connectivity for IoT and peripherals.	1
2	Arduino Mega 2560	• ATmega2560, • 54 Digital I/O Pins, • 16 Analog Inputs	1
3	Digital Servo Motors	• 16x Servos; • Torque: 10-12 kg-cm (for legs), • 2.5-4 kg-cm (for arms/head)	1
4	Raspberry Pi Camera V2	• Model: Raspberry Pi Camera Module V2 • Sensor: Sony IMX219 8-megapixel • Still Picture Resolution: 3280 × 2464 pixels • Video Modes Supported: • 1080p @ 30fps • 720p @ 60fps • 640 × 480p @ 90fps • Lens Type: Fixed focus • Lens Focal Length: 3.04 mm • Diagonal Field of View (FoV): 62.2° • Aperture: f/2.0 • Camera Interface: CSI (Camera Serial Interface)	1

		• Cable: 15 cm flat ribbon cable included • Dimensions (mm): $25 \times 23 \times 9$ mm • Weight: 3 g • Compatibility: Works with Raspberry Pi 1, 2, 3, 4, and Pi Zero boards	
5	PCA9685 16-Channel Servo Driver	• 12-bit PWM control • I2C interface • Controls up to 16 servos • Compatible with Pi/Arduino	1
6	Ultrasonic Sensor (HC-SR04)	• Range 2 cm – 400 cm • Accuracy ± 3 mm • 5 V operation • For obstacle detection	1
7	IMU Sensor (MPU6050)	• 3-axis accelerometer + 3-axis gyro • I2C communication • 3.3–5 V compatible • Used for balance control	1
8	USB Desktop Microphone	• Plug & Play via USB • Omnidirectional condenser mic • 50 Hz – 16 kHz response • Used for voice input	1
9	OLED Display (0.96", SSD1306)	• 128×64 resolution • White color • I2C interface • 3.3 V/5 V compatible • Used for robot expression	1
10	LCD Keypad Shield (16×2)	• 1602 blue backlight display • Integrated navigation buttons • Arduino compatible • Displays menus/sensor data	1
11	Grove Speaker Module	• Operating voltage: 3.3 V–5 V • Output: 0.5 W (typical) • Simple tone generation • For voice feedback	1
12	SIM800L GSM Module	• Quad-band 850/900/1800/1900 MHz • UART serial interface • SMS, GPRS, HTTP support • External antenna	1

13	SX1278 LoRa Module (Ra-02)	• Model: Ra-02 (based on Semtech SX1278 chip) • Frequency Range: 410 MHz – 525 MHz (default 433 MHz) • Modulation Technique: LoRa (Long Range) Spread Spectrum • Communication Interface: SPI (Serial Peripheral Interface) • Data Rate: 0.018 kbps – 37.5 kbps • Output Power: Up to +20 dBm (100 mW) • Receiver Sensitivity: –148 dBm (maximum) • Communication Distance: • Up to 5 km (line of sight, low interference) • Antenna Interface: IPEX (U.FL) connector • Power Supply Voltage: 1.8V – 3.7V DC (typical 3.3V) • Current Consumption: • TX: 120 mA (max) • RX: 10.3 mA • Sleep: 0.2 μA • Operating Temperature: –40°C to +80°C • Protocol Support: LoRa™ and FSK modulation • Dimensions: 17 mm $\times$ 16 mm $\times$ 2 mm • Weight: ~2 g	1
14	HC-05 Bluetooth Module	• Bluetooth v2.0 + EDR • UART serial link • Master/Slave configurable • 10 m range	1
15	5V 8-Channel Relay Module	• 8$\times$ SPDT relays • 10A @ 250 VAC load • Optocoupler isolation • Active low triggers	1
16	MB102 Breadboard Power Supply	• Input: 6.5–12 V DC or USB • Output: 3.3 V / 5 V (dual rails) • ON/OFF switch • Short-circuit protection	1
17	12V Li-ion Battery Pack (HKN)	• 12 V, 3000 mAh rechargeable • Built-in BMS protection • DC barrel output • 12.6 V charger support	1

18	LM2596 Buck Converter	• Adjustable output (1.25 – 35 V) • Input: 4.5 – 40 V • Efficiency > 90% • Powers servos and logic	1
19	Structural Frame / Body Kit	• Acrylic or aluminum frame • 35–50 cm height • Modular servo joints • 12–18 DOF design	1
20	Jumper Wires, Nuts & Connectors	• 20 cm male–female wires • M3 bolts/nuts, brackets • Breadboard-friendly connectors	1
21	Assembly Tools & Misc.	• Screwdriver set, glue gun, spacers • Double-sided tape, servo horns	1