



Veer Madho Singh Bhandari Uttarakhand Technical University Campus Institute

टी०एच०डी०सी० हाइड्रोपावर अभियांत्रिकी एवं प्रौद्योगिकी संस्थान, टिहरी

THDC Institute of Hydropower Engineering & Technology, Tehri

Bhagirathipuram, Tehri Garhwal, 249124 Uttarakhand, India

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Department of Computer Science and Engineering



INVITATION FOR QUOTATIONS

(For Supply, Installation & Training of Emerging Technologies Laboratory - Artificial Intelligence)

To,

All Authorized / Potential Suppliers,

Subject: Invitation of quotations for the supply and installation of equipment for the AI Emerging Technologies Laboratory and conducting a hands-on training session.

1. Introduction:

The Institute is in the process of establishing a **State-of-the-Art Artificial Intelligence Emerging Technologies Laboratory** for academic and research purposes. This lab will support experiments and student projects in AI applications.

Quotations are invited from reputed suppliers/manufacturers for the **supply, installation, and demonstration** of the required hardware components, along with a **one- to two-day training session** for faculty and students on usage and experiment setup.

2. Scope of Supply:

The quotation should include prices for the equipment as listed in Annexure-A.

3. Type of Experiments Planned:

The lab will facilitate the following categories of experiments and projects (not limited to):

- **Smart Security Camera**

Use object detection (YOLO, SSD, or Faster R-CNN) to detect people, animals, or vehicles.
Add facial recognition to identify known individuals.

- **AI-powered Robot**
Build an autonomous robot car that can do lane following, obstacle avoidance, or even voice-controlled navigation.
 - **Real-time Sign Language Translator**
Train a model to recognize hand gestures and convert them into text or speech.
 - **Voice Assistant (like Alexa/Google Home)**
Use speech recognition and text-to-speech to create a custom assistant.
 - **Smart Mirror**
Display weather, time, calendar, and even respond to voice commands.
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4. Training Requirement:

Vendors must include in their quotation the provision of:

- **1–2 days of on-site training** for faculty and students after installation.
 - Training should cover:
 - System setup and calibration
 - Software environment installation (Python, TensorFlow, OpenCV, IoT platforms)
 - Demonstration of 3–5 sample experiments
 - Maintenance and troubleshooting guidelines
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5. Quotation Terms & Conditions:

1. The quotation should be submitted in **sealed format** or via **official email** on or before **2025**.
 2. The rates quoted should be **inclusive of GST, transportation, and installation charges**.
 3. The supplier must provide a **minimum one-year warranty** for all items.
 4. Delivery period should not exceed **30 days** from the date of Purchase Order.
 5. Payment will be made after satisfactory installation, testing, and training completion.
 6. The institute reserves the right to **accept or reject any quotation** without assigning any reason.
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6. Submission Details:

Quotations should be addressed to:

Director

THDC Institute of Hydropower Engineering and Technology,
Bhagirathipuram,
New Tehri-249124
Uttarakhand

(Annexure-A)

Emerging Technologies Lab

Artificial Intelligence

Sno.	Equipment	Specification	Quantity
1	NVIDIA Jetson Nano Deployment Kit (B01-4GB)	• Module Compatibility: Jetson™ Nano/ Xavier NX • PCB Size / Overall Size: 100mm X 80mm • Display: 1x HDMI and 1x DP • CSI Camera: 2 • Ethernet: 1x Gigabit Ethernet (10/100/1000M) • USB: 4x USB 3.1 Type-A (10Gbps for NX, 5Gbps for Nano); 1x USB Type-C (Device mode) • 1x M.2 Key E, 1x M.2 Key M • FAN: 1x fan connector • 1x CAN • Multifunctional Port: 1x 40-Pin, 1x 12-Pin • RTC: RTC 2-pin, RTC socket(reserved) • Power supply: 12V/6A(Barrel Jack 5.5/2.1mm)	01
2	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) • Cable: 15 cm flat ribbon cable included • Dimensions (mm): 25 × 23 × 9 mm • Weight: 3 g	01

		Compatibility: Works with Raspberry Pi 1, 2, 3, 4, and Pi Zero boards	
3	MicroSD Card	32–64 GB, Class 10	01
4	5v 4a power supply	-	01
5	Metal Chassis with Encoder Motors and Front Steering Servo	Aluminum body 12 V Encoder Geared Motors	01
6	L298N-BOARD L298 Motor Drive board module stepper dc motor	- Logical voltage: 5V, Driving voltage: 5V-35V - Logical current: 0mA-36mA - Driving current: 2A (MAX single bridge) - Storage temperature: (-20 °C)-(+135 °C) - Maximum power: 25W - Driver chip: L298 dual H-bridge driver chip.	01
7	7.4V 4000Mah 3C 2S2P Li-Ion Battery Pack	- Nominal Capacity (mAh): 4000 - Nominal Voltage (v): 7.4 - Max Charging Voltage (v): 8.4 - Charge Port: DC Jack Female - Discharge Port: Amass Nylon T - Connector: JST Connector	01
8	360° 2D LiDAR Sensor	- Model: G2 - Ranging Distance: 12m - Supply Voltage: 5.2 V - Working current: 500mA - Field of view: 360° - Ranging Frequency: 5000 times per second - Motor Frequency: 12 Hz	01
9	1024*600 HDMI, IPS Capacitive Touch Screen LCD (H)	- Display Type: LCD - Display size: 7 inch - Viewing Angle: 170 degree - Touch Type: Capacitive - Resolution: 1024×600	01
10	Raspberry Pi 4 Model B 4GB Budget Kit	Quad-Core Processor (1.5GHz): Fast performance with improved processing power.	01

		• 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.	
11	Raspberry Pi USB Plug and Play Desktop Microphone	• Type: USB Desktop Microphone • Compatibility: Raspberry Pi, Windows, macOS, Linux (plug & play, no drivers needed) • Connection Interface: USB 2.0 • Microphone Type: Condenser Microphone • Polar Pattern: Omnidirectional • Frequency Response: 50 Hz – 16 kHz • Sensitivity: -58 dB ± 3 dB • Impedance: ≤ 2.2 kΩ • Cable Length: ~1.5 m • Stand: Adjustable desktop stand included • Color: Black	01
12	Seed Studio Grove Speaker	• Rated Power: 0.7 W • Maximum Power: 0.8 W • Impedance: 8 Ω ± 20% • Resonant Frequency: 520 Hz ± 180 Hz • Frequency Response Range: 400 Hz ~ 10 kHz • Total Harmonic Distortion: ≤ 5% (at 1 kHz, 1 mW) • Signal-to-Noise Ratio (SNR): ≥ 90 dB • Sound Pressure Level (SPL): 88 dB ± 3 dB (at 0.1 m / 0.1 W) • Operating Voltage: 3.3 V / 5 V • Interface: Grove 4-pin (Digital) • Dimensions: 40 mm × 20 mm × 14 mm	01

13	Soil Moisture Sensor	• Operating Voltage: 3.3 V – 5 V • Output Type: Analog and Digital (dual output) • Analog Output: 0–1023 (varies with soil moisture level) • Digital Output: High / Low signal from comparator (threshold adjustable via potentiometer) • Comparator IC: LM393 • Indicator LEDs: • Power LED (Red) • Digital output status LED (Green) • Probe Material: Corrosion-resistant metal • Dimensions: • Sensor board: ~3 cm × 1.5 cm • Probe length: ~6 cm • Cable Length: ~20 cm (3-pin female jumper cable) • Interface Pins: • VCC → 3.3 V–5 V • GND → Ground • AO → Analog output • DO → Digital output	01
14	DHT11 Temperature & Humidity Sensor	• Power Supply: 3.3 V – 5.5 V DC • Measuring Range: • Humidity: 20% – 90% RH • Temperature: 0°C – 50°C • Accuracy: • Humidity: ±5% RH • Temperature: ±2°C • Sampling Rate: 1 Hz (1 reading per second) • Output Signal: Digital (Single-bus) • Dimensions: ~15.5 mm × 12 mm × 5.5 mm • Interface Pins: VCC, Data, NC, GND • Operating Current: 0.3 mA (measuring) / 60 µA (standby)	01
15	Light Sensor (LDR)	• Model: GL5549 • Type: Photoresistor / Light Dependent Resistor (LDR) • Diameter: 5 mm • Peak Wavelength: 540 nm	01

		• Light Resistance (10 Lux): 10 kΩ – 20 kΩ • Dark Resistance: $\geq$ 1 MΩ • Maximum Voltage: 150 V DC • Maximum Power Dissipation: 100 mW • Operating Temperature Range: –30°C to +70°C • Spectral Peak: 540 nm (visible green light range) • Response Time: • Rise Time: 20 ms • Fall Time: 30 ms • Material: Cadmium Sulfide (CdS) • Mounting Type: Through-hole	
16	Relay Module with Automatic Delay Timer	• Operating Voltage: 12V DC • Trigger Voltage: 12V DC signal • Relay Type: SPDT (Single Pole Double Throw) • Contact Current Rating: 10A @ 250V AC or 10A @ 30V DC • Adjustable Delay Time Range: 0 □ 10 seconds (using onboard potentiometer) • Control Signal: Active High trigger • Indicator LEDs: • Power status LED • Relay status LED • Input Interface: • DC+ (12V input) • DC□ (Ground) • IN (signal trigger pin) • Output Interface: • COM (Common) • NO (Normally Open) • NC (Normally Closed) • Module Dimensions: Approx. 63 mm · 25 mm · 19 mm • Mounting Holes: Yes, for easy installation • Operating Temperature: □40°C to +85°C	01
17	Water Pump Module DC12V 3W Submersible Water Pump	• Rated Voltage: 12V DC • Operating Voltage Range: 5V □ 12V DC • Rated Power: 3W • Max Flow Rate: 240 L/h (liters per hour) • Max Lift (Head): 1.5 meters • Outlet Outer Diameter: 8.5 mm • Outlet Inner Diameter: 6 mm • Noise Level: < 35 dB (low noise) • Material: Engineering plastic (waterproof and durable) • Pump Type: Submersible, brushless motor	01

		• Drive Mode: DC, electronic commutation (no sparks) • Waterproof Level: IP68 • Life Span: > 30,000 hours continuous operation • Operating Temperature Range: 0°C □ 60°C • Cable Length: ~1 meter • Dimensions: 45 mm · 35 mm · 25 mm • Weight: ~50 g	
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IoT Lab Specification

Sno.	Equipment	Specification	Estimated Price
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.	Rs. 7,000/-
2	NodeMCU ESP8266 WiFi Module	• Processor: Dual-core Xtensa LX6 @ 240MHz • Flash Memory: 4MB • WiFi + Bluetooth: 802.11 b/g/n + BLE 4.2 • GPIO Pins: 30–36 (varies by board) • Operating Voltage: 3.0–3.6V	Rs. 340/-
3	Arduino Uno R3	Microcontroller: ATmega328P Operating Voltage: 5V Digital I/O Pins: 14 (6 PWM outputs) Analog Input Pins: 6 Clock Speed: 16 MHz Flash Memory: 32 KB	Rs. 350/-
4	Sensors & Modules Pack (Basic IoT Starter Kit)	DHT11 (Temp & Humidity) LDR (Light Sensor) ☐ Soil Moisture Sensor ☐ Ultrasonic Sensor HC-SR04 ☐ IR Obstacle Sensor ☐ MQ-2 Gas Sensor ☐ Relay Module (5V / 12V)	Rs. 1000/-
5	Metal Chassis with Encoder Motors and Front Steering Servo	Aluminum body 12 V Encoder Geared Motors	Rs. 7,000/-
6	L298N-BOARD L298 Motor Drive board module stepper dc motor	• Logical voltage: 5V, Driving voltage: 5V-35V • Logical current: 0mA-36mA • Driving current: 2A (MAX single bridge)	Rs. 200/-

		- Storage temperature: (-20 °C)-(+135 °C) - Maximum power: 25W - Driver chip: L298 dual H-bridge driver chip.	
7	7.4V 4000Mah 3C 2S2P Li-Ion Battery Pack	- Nominal Capacity (mAh): 4000 - Nominal Voltage (v): 7.4 - Max Charging Voltage (v): 8.4 - Charge Port: DC Jack Female - Discharge Port: Amass Nylon T - Connector: JST Connector	Rs. 1000/-
8	360° 2D LiDAR Sensor	- Model: G2 - Ranging Distance: 12m - Supply Voltage: 5.2 V - Working current: 500mA - Field of view: 360° - Ranging Frequency: 5000 times per second - Motor Frequency: 12 Hz	Rs. 14,000/-
9	1024*600 HDMI, IPS Capacitive Touch Screen LCD (H)	- Display Type: LCD - Display size: 7 inch - Viewing Angle: 170 degree - Touch Type: Capacitive - Resolution: 1024×600	Rs. 5000/-
10	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.	Rs. 7,000/-
11	Raspberry Pi USB Plug and Play Desktop Microphone	- Type: USB Desktop Microphone - Compatibility: Raspberry Pi, Windows, macOS, Linux (plug & play, no drivers needed)	Rs. 700/-

		• Connection Interface: USB 2.0 • Microphone Type: Condenser Microphone • Polar Pattern: Omnidirectional • Frequency Response: 50 Hz – 16 kHz • Sensitivity: -58 dB $\pm$ 3 dB • Impedance: $\leq$ 2.2 kΩ • Cable Length: ~1.5 m • Stand: Adjustable desktop stand included • Color: Black	
12	Seed Studio Grove Speaker	• Rated Power: 0.7 W • Maximum Power: 0.8 W • Impedance: 8 Ω $\pm$ 20% • Resonant Frequency: 520 Hz $\pm$ 180 Hz • Frequency Response Range: 400 Hz ~ 10 kHz • Total Harmonic Distortion: $\leq$ 5% (at 1 kHz, 1 mW) • Signal-to-Noise Ratio (SNR): $\geq$ 90 dB • Sound Pressure Level (SPL): 88 dB $\pm$ 3 dB (at 0.1 m / 0.1 W) • Operating Voltage: 3.3 V / 5 V • Interface: Grove 4-pin (Digital) • Dimensions: 40 mm $\times$ 20 mm $\times$ 14 mm	Rs. 800/-
13	Soil Moisture Sensor	• Operating Voltage: 3.3 V – 5 V • Output Type: Analog and Digital (dual output) • Analog Output: 0–1023 (varies with soil moisture level) • Digital Output: High / Low signal from comparator (threshold adjustable via potentiometer) • Comparator IC: LM393 • Indicator LEDs: • Power LED (Red) • Digital output status LED (Green) • Probe Material: Corrosion-resistant metal • Dimensions: • Sensor board: ~3 cm $\times$ 1.5 cm	Rs. 200/-

		• Probe length: ~6 cm • Cable Length: ~20 cm (3-pin female jumper cable) • Interface Pins: • VCC → 3.3 V–5 V • GND → Ground • AO → Analog output • DO → Digital output	
14	DHT11 Temperature & Humidity Sensor	• Power Supply: 3.3 V – 5.5 V DC • Measuring Range: • Humidity: 20% – 90% RH • Temperature: 0°C – 50°C • Accuracy: • Humidity: ±5% RH • Temperature: ±2°C • Sampling Rate: 1 Hz (1 reading per second) • Output Signal: Digital (Single-bus) • Dimensions: ~15.5 mm × 12 mm × 5.5 mm • Interface Pins: VCC, Data, NC, GND • Operating Current: 0.3 mA (measuring) / 60 µA (standby)	Rs. 100
15	Light Sensor (LDR)	• Model: GL5549 • Type: Photoresistor / Light Dependent Resistor (LDR) • Diameter: 5 mm • Peak Wavelength: 540 nm • Light Resistance (10 Lux): 10 kΩ – 20 kΩ • Dark Resistance: ≥ 1 MΩ • Maximum Voltage: 150 V DC • Maximum Power Dissipation: 100 mW • Operating Temperature Range: –30°C to +70°C • Spectral Peak: 540 nm (visible green light range) • Response Time: • Rise Time: 20 ms • Fall Time: 30 ms • Material: Cadmium Sulfide (CdS) • Mounting Type: Through-hole	Rs. 200
16	Relay Module with Automatic Delay Timer	• Operating Voltage: 12V DC • Trigger Voltage: 12V DC signal • Relay Type: SPDT (Single Pole Double Throw)	Rs. 550/-

		• Contact Current Rating: 10A @ 250V AC or 10A @ 30V DC • Adjustable Delay Time Range: 0 □ 10 seconds (using onboard potentiometer) • Control Signal: Active High trigger • Indicator LEDs: • Power status LED • Relay status LED • Input Interface: • DC+ (12V input) • DC□ (Ground) • IN (signal trigger pin) • Output Interface: • COM (Common) • NO (Normally Open) • NC (Normally Closed) • Module Dimensions: Approx. 63 mm · 25 mm · 19 mm • Mounting Holes: Yes, for easy installation • Operating Temperature: □40°C to +85°C	
17	Water Pump Module DC12V 3W Submersible Water Pump	• Rated Voltage: 12V DC • Operating Voltage Range: 5V □ 12V DC • Rated Power: 3W • Max Flow Rate: 240 L/h (liters per hour) • Max Lift (Head): 1.5 meters • Outlet Outer Diameter: 8.5 mm • Outlet Inner Diameter: 6 mm • Noise Level: < 35 dB (low noise) • Material: Engineering plastic (waterproof and durable) • Pump Type: Submersible, brushless motor • Drive Mode: DC, electronic commutation (no sparks) • Waterproof Level: IP68 • Life Span: > 30,000 hours continuous operation • Operating Temperature Range: 0°C □ 60°C • Cable Length: ~1 meter • Dimensions: 45 mm · 35 mm · 25 mm • Weight: ~50 g	Rs. 350/-
Total			Rs. 69,800/-

