



National University
of computer and emerging sciences

Sr. No. _____

BIDDING DOCUMENT

Tender No: 01/2026/FAST-NRPU-20-**164540– 60/01**
Purchase of NRPU Project Lab Equipment

For

**FAST-NATIONAL UNIVERSITY OF
COMPUTER & EMERGING SCIENCES
(FAST-NUCES), KARACHI.**



Tender Notice | Purchase of NRPU Project Equipment

1. The “*Design and Validation of an AI-Driven Unified Control System for Electric Vehicle Powertrain and Charging Optimization*”, funded under **HEC-NRPU at Karachi Campus** of the University invites sealed bids from the authorized distributors (With Valid Distribution Certificate)/suppliers/well-reputed firms/service providers registered with Income Tax and Sales Tax Departments and who are on Active Tax Payers List (ATL) of the Federal Board of Revenue, for the purchase of following **Twenty three (23)** items/lab equipment for the mentioned quantities for HEC – NRPU Project Ref. **164540– 60**.

Sr.#	Name of Item/Equipment	Qty
I	Core Real-Time HIL Platform	1
II	Bidirectional DC–DC Buck–Boost Converter	2
III	Three-Phase DC–AC Inverter for EV Traction Motor	1
IV	Gate Driver Boards for EV DC–DC Converter / Three-Phase Inverter	2
V	EV-Type Three-Phase Electric Motor	1
VI (a)	Motor Dynamometer	1
VI (b)	Programmable Electronic Load	1
VII	Mechanical Coupling, Mounting Base & Safety Guard	1
VIII	Bidirectional DC Power Supply (Battery Emulator)	2
IX	Programmable DC Power Supply (Fuel-Cell Emulator)	1
X	Wireless Power Transfer (WPT) Transmitter & Receiver Coil and AC to DC converter	1
XI	High-Frequency Resonant Inverter & Compensation Network for WPT	1
XII	300 Vrms-Class Isolated Voltage Input / Measurement Module	1
XIII	AC/DC Current & Voltage Data Acquisition Module	1
XIV	Industrial 4-Channel Analog Output (AO) DAC Module	1
XV	Host PC / Workstation for EV Simulation, HIL & Machine Learning	3
XVI	Small-Capacity EV Battery Module	1
XVII	Supercapacitor Module	1
XVIII	Unidirectional DC–DC Boost Converter	1



XIX	DC Bus / DC-Link Assembly	1
XX	Motor Speed Sensor	1
XXI	Isolated CAN Transceiver	1
XXII	Isolated DC Voltage Sensor	7
XXIII	Isolated DC Current Sensor	7
Total		41

2. Bidding shall be carried out by “Single Stage Two Envelope” procedure. Bidding documents containing detailed terms & conditions etc. are available at Procurement Office/ Basement 1/ Academic Block 1/ Main Campus/St-4 Sector 17-D On National Highway Karachi, Pakistan. Tender notice and bidding documents can also be downloaded from www.nu.edu.pk/Events/Details/551

3. The bids having separate sealed envelopes clearly marked as **Technical and Financial Bid**, prepared in accordance with the instructions as mentioned in the bidding document, must reach on or before **Tuesday, September 29, 2026, until 14:30** at Procurement Office/ Basement 1/ Academic Block 1/ Main Campus/St-4 Sector 17-D On National Highway Karachi, Pakistan. **Technical Bids** will be opened on the same day, i.e., **Tuesday, September 29, 2026, at 15:00 Hours** in the presence of bidders/their representatives. The second envelope containing “**Financial Bid**” of technically qualified bidder(s) will be opened later, the date of which will be communicated after the evaluation of Technical Bids.

4. The University reserves the right to accept or reject any/all bid(s) as per the prescribed Procurement Rules of the University.

Procurement Department
FAST – National University of Computer & Emerging Sciences,
Karachi



National University
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Annexure A

Terms and Conditions



FAST-NATIONAL UNIVERSITY OF COMPUTER & EMERGING SCIENCES (FAST-NUCES), Procurement Office/ Basement 1/ Academic Block 1/ Main Campus/St-4 Sector 17-D On National Highway Karachi, Pakistan.

Tender No. 01/2026/FAST-NRPU-20-164540– 60/01

Subject: TENDER DOCUMENT FOR PURCHASE OF LAB EQUIPMENT (ITEMS)

"TERMS AND CONDITIONS"

[All pages (BOQs & Terms & Conditions) are mandatory to be signed / Stamped, failing which the bid may be rejected.]

1. Any addition, deletion, or modification of any clause of the procurement terms & conditions of Fast-National University of Computer & Emerging Sciences, Islamabad by any vendor will not be acceptable and may lead to rejection of the bid.
2. Original Manufacturer / Authorized Distributors (with valid authorization / distribution certificate)/ Suppliers /well-reputed Firms / Service Providers registered with Income Tax, Sales Tax Department and who are on Active Taxpayers List (ATL) of FBR, are eligible to participate in the tender.
3. Part / Advance payments are not allowed.
4. The exact completion/delivery time from the date of the purchase / work order will be a **maximum** of **60** days. The handing over / completion / installation time is of critical importance.
5. The bid proposal(s) should be inclusive of all the taxes and must be quoted on “FOR Basis” as per BOQs Format [Items deliverable (free of cost)] to SAFE Lab at Fast-National University of Computer & Emerging Sciences, Islamabad.
6. The Payment terms will be for the FOR quoted items; 100% payment will be made after supply and successful inspection of the ordered equipment(s).
7. After the opening of bids Fast-National University of Computer & Emerging Sciences, Islamabad will examine the bids for completeness as per tender document’s Terms & Conditions and Technical Specifications (As per BOQ).
8. Purchase order(s) will be awarded to the lowest evaluated bidder according to the nature of BOQs/Compatibility requirements that meet the Technical specifications compliance matrix (Annexure B).
9. Fast-National University of Computer & Emerging Sciences, Islamabad, will follow the PPRA rule of **Single Stage Two Envelope procedure**.



a. The Bid shall comprise two envelopes submitted simultaneously, one called the **Technical Bid** and the other the **Financial Bid**. Both envelopes to be enclosed together in an outer single envelope called the Bid.

b. The Bidder shall prepare **one (1) original** of the Technical Bid and one original of the Financial Bid comprising the Bid and clearly mark it "ORIGINAL - TECHNICAL BID" and "ORIGINAL - FINANCIAL BID". In addition, the Bidder shall submit **one (1) copy** of the Technical and Financial Bid and clearly mark each of them "COPY." In the event of any discrepancy between the original and the copies, the original shall prevail.

10. Bidders cannot challenge the findings of the evaluation or ask for the reason of disqualification.

11. The bid should be submitted in a sealed envelope up to **Tuesday, September 29, 2026, until 14:30** at Procurement Office/ Basement 1/ Academic Block 1/ Main Campus/St-4 Sector 17-D On National Highway Karachi, Pakistan. **Technical Bids** will be opened on the same day, i.e., **Tuesday, September 29, 2026, at 15:00 Hours**.

12. The envelope should be marked as under;

Assistant Manager Purchase

NRPU Project: 20-164540– 60

Procurement Office/ Basement 1/ Academic Block 1/ Main Campus/St-4 Sector 17-D On National Highway Karachi, Pakistan.

13. The envelope shall also bear the word "**CONFIDENTIAL**" and following identification quotation for "**Purchase of Equipment item(s) for NRPU Project #-20-164540– 60, FAST-NUCES**"

14. The bid form (BOQs) must be duly filled in, stamped, and signed by the authorized representative of the bidder.

15. **If the vendor fails to deliver the goods to FAST-National University of Computer & Emerging Sciences, Karachi in time then the penalty will be charged as below:**

a. 02% per month of the total Purchase Order value.

b. If the vendor fails to deliver the goods / services during the extended period (if granted) then the purchase / work order may be cancelled and bid security may be forfeited.

16. If the delivered goods are not according to the required quality standards / specifications, the same shall be liable to be rejected after inspection. The bidder/vendor

would be required to REPLACE as per requirements mentioned in our BOQs at no cost to the FAST-NUCES, otherwise the purchase / work order will be cancelled after the due date with confiscation of bid security AND bidder will bear all cost and expenses thereof.

17. All prices should be quoted on **FOR Basis (inclusive of all applicable taxes)**

18. All prices should be valid for at least **60 days**. Withdrawal or any modification of the original offer within the validity period shall entitle FAST-NUCES to forfeit the earnest money in favor of the FAST-NUCES and / or put a ban on such vendor participation in FAST-NUCES tenders / works.

19. It is the sole responsibility of the bidder / agent / supplier / manufacturer to comply with the applicable laws, be national or international.

20. In case of any dispute, the decision of the Rector, FAST-NUCES will be final and binding upon the parties.

21. The FAST-NUCES reserves the right to modify the quantities of goods / services at any time before the award of purchase/ work order.

22. The bidder is required to furnish in form of "Pay Order/Demand Draft/Call Deposit" **02% (Refundable)** of the total value of the bid as Bid Security in favor of "**BCCI FAST NUCES - Design and Validation of an AI-Driven Unified Control System for Electric Vehicle Powertrain and Charging Optimization**". Any bid not accompanied by Bid Security shall be rejected without any right of appeal.

23. The bid security of 02% should be placed in the Technical Bid Envelope.

24. An amount equal to 02% (in PKR) of the total value of the Purchase Order/Contract Price shall be retained by the FAST-National University of Computer & Emerging Sciences, Islamabad from the payment of successful bidders, on FOR supplied items, for the Warranty Period (if any).

25. The bidder is required to furnish Company Profile, Client List and Detail of similar Projects/Works along with the proposal.

26. Bidder(s) complying with all conditions mentioned in the Tender "**Terms & Conditions**" **Compliance checklist (Annexure-A)** shall be selected for technical and financial evaluation. Bidder(s) not fulfilling any condition of Tender "**Terms & Conditions**" Compliance checklist shall be disqualified and their bids shall be declared non-responsive and shall not be considered for technical & financial evaluation.

27. Fast-National University of Computer & Emerging Sciences, Islamabad reserves the rights to accept or reject the bid if;

- i. Received later than the date and time fixed for tender submission



- ii. The tender is unsigned/ unstamped
- iii. The offer is ambiguous
- iv. The offer is conditional
- v. Offer is made by the unauthorized agent/supplier of the original equipment manufacturer.
- vi. The offer is from a firm, which is blacklisted by any Govt. Office.
- vii. The offer is received by telephone/telex/fax/telegram.
- viii. Any unsigned / ambiguous erasing, cutting / overwriting etc. is made.
- ix. The Company Profile, client list and detail of similar projects/works is not attached.
- x. Without Guarantee/Warranty of the quoted equipment(s).

28. The bidder should furnish a **CERTIFICATE** (duly attested) on **judicial STAMP PAPER** worth **Rs. 100** as worded below in token of acceptance of all the terms and conditions of the tender. Otherwise, the tender will not be considered under any circumstances.

I / We

- Company / Vendor Name: _____
- Postal Address: _____
- Tel. No: _____
- Mob No. _____
- NTN#: _____
- GST#: _____

The undersigned certifies that our above-named Firm/Company is not blacklisted by any Govt. Office and the terms and conditions as contained in this document, viz **"Terms and Conditions"** are accepted unconditionally.

Sign & Stamp

Note:

1. Please quote the rates on our BOQs and clearly mention the quoted item(s) Make / Model / Country of Origin and Guarantee/Warranty, otherwise your bid / items may lead to rejection.



2. The quoted item(s) should be of the same specs, make/model or their equivalent.
3. In Addition to the filling of the attached BOQs, supporting literature of the quoted model must be attached for verification & technical evaluation of the required specification by the bid evaluation committee. In case of any clash found between the quoted model, and literature model, the item/bid may be rejected.
4. Please also attach the **Certificate supporting being Active Taxpayer** as per the requirement of FBR



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Annexure B

BOQs for Required Items



BOQ for Items I to XXIII

Sr.#	Name of Items	Rating / Option	Specifications	Qty	Unit Price	Cumulative Price	Applicable Taxes	Total Price (Rs.)
I	Core Real-Time HIL Platform	Option A	Deterministic real-time execution <1 ms; integrated/external FPGA; high-speed I/O; minimum 176-pin Delfino C2000-class interface; suitable for EV powertrain real-time control and HIL testing.	1				
		Option B	Same functional requirements as Option A, with higher computational/FPGA/I/O capability where available; suitable for multi-subsystem EV HIL simulation.					
II	Bidirectional DC-DC Buck-Boost Converter	Option A – 2 kW	Bidirectional operation; low-voltage side 36–80 V; high-voltage side 300–450 V; PWM controlled; closed-loop voltage/current control; suitable for EV battery/ultra-capacitor interfacing.	2				
		Option B – 3 kW	Bidirectional operation; low-voltage side 48–80 V; high-voltage side approximately 300–450 V; PWM controlled; closed-loop voltage/current					



			control; suitable for EV battery/ultra-capacitor interfacing.					
III	Three-Phase DC-AC Inverter for EV Traction Motor	Option A – 40 A	DC input/output operating range covering approximately 200–500 V DC; current capability up to 40 A; three-phase AC output; PWM control; suitable for PMSM/BLDC/SynRM EV motor testing.	1				
		Option B – 60 A	DC input/output operating range covering approximately 200–500 V DC; current capability up to 60 A; three-phase AC output; PWM control; suitable for PMSM/BLDC/SynRM EV motor testing.					
IV	Gate Driver Boards for EV DC-DC Converter / Three-Phase Inverter	MOSFET/IGBT	MOSFET/IGBT gate-driver board for high-frequency PWM switching ≥ 10 kHz; isolated/appropriate gate drive; over-current/under-voltage/short-circuit protection; compatible with laboratory DC-DC converters and inverter applications.	2				



V	EV-Type Three-Phase Electric Motor	Option A – ~1.0 kW	PMSM, BLDC or SynRM; rated power approximately 1.0 kW; speed range 3000–4000 rpm; three-phase; suitable for EV traction/control experiments.	1				
		Option B – ~1.5 kW	PMSM, BLDC or SynRM; rated power approximately 1.5 kW; rated speed approximately 3000–4000 rpm; three-phase; suitable for EV traction/control experiments.					
VI (a)	Motor Dynamometer	Option A – 2 kW	Suitable for electric motor laboratory testing; programmable torque/load; Regenerative braking support; continuous torque measurement accuracy approximately $\pm 1\%$ or better; speed capability up to 3000 rpm.	1				
		Option B – 3 kW	Same minimum functional requirements as Option A, rated for approximately 3 kW motor testing; programmable dynamic load/torque.					



VI (b)	Programmable Electronic Load		Power & Speed: Rated for 1–3 kW electric motors operating at speeds up to 3000 RPM. Control & Response: Programmable torque and power control with rapid dynamic load response (≥ 100 Hz). Accuracy & Application: Continuous torque measurement accuracy of $\pm 1\%$ tailored for real-time EV traction motor HIL testing.	1				
VII	Mechanical Coupling, Mounting Base & Safety Guard	Option A – 1 kW motor set	Rigid motor–load coupling, mounting base and alignment arrangement; suitable for the quoted 1–1.14 kW EV motor/dynamometer; includes necessary guards and coupling hardware.	1				
VIII	Bidirectional DC Power Supply (Battery Emulator)	Option A – 1.5 kW	Bidirectional source/sink operation; 0–80 V DC; current capability ± 30 A; programmable voltage/current; suitable for EV battery emulation.	2				
		Option B – 2 kW	Bidirectional source/sink operation; 0–80 V DC; current capability approximately ± 40 A; programmable					



			voltage/current; suitable for EV battery emulation.					
IX	Programmable DC Power Supply (Fuel-Cell Emulator)	Option A – 1.5 kW	Programmable DC source; 0–60 V; up to 30 A; approximately 1.5 kW; suitable for fuel-cell emulation.	1				
		Option B – 2 kW	Programmable DC source; 0–80 V; up to 60 A; approximately 2 kW; suitable for fuel-cell emulation.					
X	Wireless Power Transfer (WPT) Transmitter & Receiver Coil and AC to DC converter	Option A: 0.5–1 kW	(1) Output capacity 0.5–1 kW; resonant operating frequency 20–100 kHz; up to 400 V AC resonant link; planar spiral or DD coils; 50–150 mm air gap; misalignment tolerance approximately ± 100 mm lateral and ± 50 mm longitudinal; suitable for EV wireless charging research. (2) High-frequency AC-to-DC rectifier and regulated DC–DC converter for EV wireless power transfer, compatible with 20–100 kHz resonant input, rated for 1 kW operation, DC output suitable for 80 V battery charging.	1				



		Option B: 1–2 kW	(1) Output capacity 1–2 kW; otherwise, same minimum WPT coil requirements; suitable for EV wireless charging research. (2) High-frequency AC-to-DC rectifier and regulated DC–DC converter for EV wireless power transfer, compatible with 20–100 kHz resonant input, rated for 2 kW operation, DC output suitable for 80 V battery charging.					
XI	High-Frequency Resonant Inverter & Compensation Network for WPT	Option A – 1 kW	Half-bridge/full-bridge high-frequency resonant inverter; adjustable 20–100 kHz; approximately 1 kW output; 100–400 V DC input; tunable LCC, LCL or series/parallel compensation network.	1				
		Option B – 2 kW	Same topology and control requirements; approximately 2 kW output; 100–400 V DC input; tunable compensation network.					



XII	300 Vrms-Class Isolated Voltage Input / Measurement Module	Option A – Standard	0–450 V DC (approximately 0–320 Vrms AC); ≥ 12 -bit resolution; ≤ 10 mV step where applicable; $\pm 0.5\%$ accuracy; DC–10 kHz bandwidth; ≥ 1.5 kV AC isolation; ≥ 600 V DC common-mode capability; ≥ 1 M Ω input impedance; ≤ 1 ms response; 0–5 V/0–10 V analog output and/or isolated SPI/DAQ.	1				
XIII	AC/DC Current & Voltage Data Acquisition Module	Option A – Standard	Minimum 16 analog input channels; ≥ 16 -bit resolution; standard ± 10 V input range; up to 100 kS/s per channel; compatible with CompactDAQ/CompactRIO C-Series or equivalent industrial DAQ platform.	1				
XIV	Industrial 4-Channel Analog Output (AO) DAC Module	Option A – Standard	4 independent analog outputs; ≥ 16 -bit DAC resolution; selectable ± 10 V range; update rate ≥ 900 S/s/channel; typical accuracy approximately $\pm 0.1\%$ full scale; CompactDAQ/CompactRIO C-Series or equivalent.	1				



XV	Host PC / Workstation for EV Simulation, HIL & Machine Learning	Option A –	Intel Core i7-12700F or better processor; ≥ 32 GB DDR5 RAM, 5600 MT/s or higher; ≥ 1 TB PCIe Gen4 NVMe SSD; NVIDIA RTX 4060 Ti 16 GB VRAM or better GPU (or equivalent); compatible motherboard; ≥ 650 W 80+ Bronze power supply; suitable CPU cooling and workstation case.	3				
		Option B –	AMD Ryzen 7 7700 or better processor; ≥ 32 GB DDR5 RAM, 5600 MT/s or higher; ≥ 1 TB PCIe Gen4 NVMe SSD; NVIDIA RTX 4060 Ti 16 GB VRAM or better GPU (or equivalent); compatible motherboard; ≥ 650 W 80+ Bronze power supply; suitable CPU cooling and workstation case.					
XVI	Small-Capacity EV Battery Module	NMC Lithium-ion/LFP	Nominal operating voltage within 12–24 V; 20–40 Ah.	1				
XVII	Supercapacitor Module	Option A – Lower capacity	Nominal voltage: 48 V DC; capacitance: approximately 100 F or higher; high-current charge/discharge capability; peak pulse power:	1				



			approximately 3–5 kW; low ESR; stored energy ≥ 30 Wh; integrated cell-voltage balancing and over-voltage protection.					
		Option B – Higher capacity	Nominal voltage: 48 V DC; capacitance: approximately 150–200 F or higher; high-current charge/discharge capability; peak pulse power: approximately 5–10 kW; low ESR; stored energy ≥ 50 Wh; integrated cell-voltage balancing and over-voltage protection.					
XVIII	Unidirectional DC–DC Boost Converter	Option A – 2 kW	Input 30–60 V DC; output 200–500 V DC; approximately 2 kW; current capability around 30–35 A on the low-voltage side.	1				
		Option B – 3 kW	Input 30–60 V DC; output 200–500 V DC; approximately 3 kW.					
XIX	DC Bus / DC-Link Assembly	600 V, 70 A	DC-link busbar/terminal assembly rated approximately 600 V DC and 70 A; suitable for EV powertrain laboratory interconnection; appropriate insulation and protection.	1				



XX	Motor Speed Sensor	3.3 V interface	speed sensor/encoder compatible with EV motor test bench; 3.3 V logic/interface; suitable for 3000–4000 rpm motor measurement; vendor shall state resolution and output type.	1				
XXI	Isolated CAN Transceiver	ISO1042 class	Isolated CAN transceiver, ISO1042 or equivalent; suitable for EV controller/CAN communication; industrial temperature range preferred; provide isolation rating and CAN bit-rate capability.	1				
XXII	Isolated DC Voltage Sensor	0 – 600 V DC	Measurement range: 0–600 V DC; analog output 0–3.3 V DC; galvanically isolated input/output; isolation withstand voltage ≥ 3 kVrms; accuracy $\leq \pm 1\%$ FS.	7				
XXIII	Isolated DC Current Sensor	Option A: ± 50 A	Bidirectional DC current measurement ± 50 A; compatible with 3.3 V ADC; analog output 0–3.0 V DC with 1.5 V at zero current; galvanic isolation ≥ 3 kVrms; accuracy $\leq \pm 1\%$ FS; response time ≤ 1 ms.	7				
		Option B – ± 100 A	Bidirectional DC current measurement ± 100 A;					



			compatible with 3.3 V ADC; analog output 0–3.0 V DC with 1.5 V at zero current; galvanic isolation ≥ 3 kVrms; accuracy $\leq \pm 1\%$ FS; response time ≤ 1 ms.					
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