



भारतीय समुद्रीय विश्वविद्यालय
Indian Maritime University
(केन्द्रीय विश्वविद्यालय, भारत सरकार / A Central University, Govt. of India)
कोलकता परिसर / Kolkata Campus



IMU-KC/Control Engineering Lab/22-23

25 October 2022

Sub: Bid for Supply and Installation of Experimental Setups for Control Engineering Laboratory of IMU – Kolkata Campus

Tender Abstract:

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| Tender No. & Date | IMU-KC/Control Engineering Lab/22-23 dated 25.10.2022 |
| Tender Title | Tender towards Supply and Installation of Experimental Setups for the Control Engineering Laboratory of IMU-KC |
| Tender documents can be downloaded from IMU-KC website www.merical.ac.in ; www.imu.edu.in | On 25.10.2022 at 1600 hrs. |
| Cost of Tender Form | Nil |
| Pre-Bid Meeting (Optional) | On 09.11.2022 at 1500 hrs. |
| Last date and time of submission | On 15.11.2022 at 1500 hrs. |
| Date and Time for Opening of the Technical Bids | On 15.11.2022 at 1530 hrs. |
| Address for Communication | The Deputy Registrar Indian Maritime University – Kolkata Campus P-19, Taratala Road Kolkata – 700 088 |

Sealed quotations are invited under Two Bid System (Technical Bid & Financial Bid) towards supply and installation of the following experimental setups for the Control Engineering Laboratory of Indian Maritime University – Kolkata Campus, located at P-19, Taratala Road, Kolkata – 700 088 with the following technical specifications:

| Sl. No. | Experimental Setups | Technical Specifications | Required Quantity (in nos.) |
|---------|--|--|-----------------------------|
| 01. | Hydraulic Set up for measurement of flow, Pressure and Temperature with ON/OFF controller. Using different transducers (at-least 2 nos.) | The setup consists of 1ph Induction motor 1HP with pump, Tank 100ltr, pressure Gauge and switch, orifice meter, Rota meter, flow meter, flow control valve, U tube manometer, inverted tube manometer, and temperature sensor (Thermostat) with Temperature control with ON/OFF controller | 01 no. |

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| 02. | Pressure transducers (Module / trainer) (Operational of Pressure transducers) | <p>Pressure Vessel: shape-cylindrical, material-CRCC, diameter- 4 inch, length-12 inch, capacity-10kg/cm², with 1/2" BSPconnection.</p> <p>A.F.R. / F.R.L.: 0-10kg/cm², with pressure gauge.</p> <p>Bellows gauge / diaphragm gauge: 0-300mm Hg / 0-2.5kg/cm² / 0-4kg/cm².</p> <p>Bourdon tube pressure gauge: Dial size-6", Range- 0-4kg/cm² Bottom connection- 1/2" BSP connection.</p> <p>Air Compressor: Tank Capacity: 25 liters, Discharge 2CFM, Motor- 2H. P 230-volt Ac</p> <p>Operated. Working Pressure: 5-6 kg/cm².</p> | 02 nos. |
| 03. | Temperature transducers Module/Trainer | <p>Transducer (4nos): NTC Thermistor, Platinum RTD, Type K Thermocouple, IC Temperature Sensor.</p> <p>Heating Element: Wire-Wound Resistance.</p> <p>Signal Conditioning Circuitry: Instrumentation Amplifier, X 100 Amplifier, DC Amplifier, Comparator, Electronic Switch.</p> <p>Inout Circuits: Rotary and Slide Potentiometers.</p> <p>Output Circuits: Relay, Buzzer. Interconnections: 4mm Banana Sockets. Power Supply: 230 V (+/-)10% 50 Hz</p> <p>Accessories: Manual set of Patch Cords.</p> | 02 nos. |
| 04. | Functioning of Mist Detector | <ul style="list-style-type: none"> • Range (measurement & indication) 0 - 30 ppm, Trend up to 50ppm • Range (IMO specification) 0 - 15 ppm (according MO regulations) Accuracy better than IMO MEPC.107(49) • Electrical power supply 24V - 240V, AC or DC, automatic selection Electrical power consumption. < 10 VA • Sample Oily water from the separator outlet, 0,1 - 4 l/min Sample temperature range. +1°C to +65°C Sample connections R 1/4" Female • Alarm 1 & 2 Set Points 1 - 15ppm (independently adjustable) Alarm 1 operating delay for annunciation 1 - 540 sec Alarm 2 operating de- lay for control 1 - 10 sec Alarm con- tacts 2 independently adjustable contacts Alarm contact operation mode De-energized in Alarm State Alarm ratings 3A, 240V each Alarm output 0 - 20 mA or 4 - 20 mA, for 30 ppm reversible, extolled | 01 no. |
| 05. | Operation of an Automatic flow, pressure/level and | <ul style="list-style-type: none"> • PID Controller with closed loop control facility • Input supply: 230V/ 50 Hz AC mains • Sensor Input: 0-24V from Controller | 01 no. |

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| | temperature Controller | <ul style="list-style-type: none"> • PID Control output: 0-10V DC • Orifice assembly • Differential Pressure Transmitter (Honeywell) • Glove Valve • Electric Linear Valve Actuator (Hoenywell) • Motor Pump-230V AC, 1/2HP 220V, operated for water circulation in line. • 3 pin electric socket is provided on unit with motor ON/OFF switch • Two Tanks | |
| 06. | Linear valve, Quick opening valve, Equal percentage valve, Plot of characteristics of all valves | <p>Control Valve: 3 nos, Characteristics - Linear, Equal (%) & quick opening, Type - pneumatic, size - 1/2", Actuator - 15 square inch, Stroke - 14mm, input - 3- 15 PSIG.</p> <p>Water Tank: Material - Stainless Steel, capacity 25 liters.</p> <p>Water Circulation: FHP pimp champion/ standard make.</p> <p>Overhead Tank: Material - Stainless Steel capacity: 10 liters.</p> <p>Flow Measurement: Rotameter.</p> <p>Pressure Head Measurement: By Single Column Manometer.</p> <p>Pressure Regulator: 0-2kg/cm².</p> <p>Pressure Gauge: Bourdon Type, 0-2kg/cm².</p> <p>Piping: Size 1/2".</p> <p>An English instruction manual consisting of experimental procedures block diagram etc. will be provided along with the apparatus.</p> <p>The whole setup is well designed and arranged on a rigid structure painted with industrial PU point.</p> | 01 no. |
| 07. | Flapper Nozzle Characteristic trainer | <p>A.P.R. / A.F.R. Unit: 0-10kg/cm² with pressure gauge.</p> <p>Micrometer: Display Electro Mechanical for Displacement.</p> <p>Pressure Gauge: 0-2kg/cm².</p> <p>Air Compressor: Tank Capacity - 25 liters, Discharge - 2CFM Motor - 2HP 230 V AC Operated, Working Pressure - 5-6kg/cm².</p> | 03 nos. |
| 08. | I/P converter Trainer and P/I converter | <p>I/P Converter: Input - 4-20mA Output - 3-15 PSI.</p> <p>P/I Converter: Input - 3-15 PSI Output - 4-20mA.</p> <p>Air Pressure Regulator: Range - 0-4.1kg/cm², with pressure gauge.</p> <p>Digital Current Indicator: Supply - 1φ 230V AC Range - 0-20mA.</p> <p>Current Source: Supply - 1φ 230V AC Range - 0-20mA.</p> <p>Pressure Vessel: Capacity - 2.1kg/cm².</p> <p>Pressure Gauge : Range - 2.1kg/cm².</p> | 01 no. |
| 09. | Valve positioner training unit with | <ul style="list-style-type: none"> • Direct Acting/Reverse acting/ATO/ATC type diaphragm actuator | 01 no. |

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| | ATO/ATC type diaphragm actuator | <ul style="list-style-type: none"> • Valve Positioner • AFR • Compressor unit • Pressure gauges • Mechanical linkage • Spare: Control Valve Positioner Cutaway | |
| 10. | LVDT Trainer Kit | DC Linear variable differential transformers, converts changes in physical position into an DC electrical output, complete set up | 03 nos. |
| 11. | Strain Gauge Trainer kit (Bonded Type) | <ul style="list-style-type: none"> • kit Strain in terms of Kilograms on a cantilever beam • Measurement System: Physical by Weights and Transducer with electronic instrumentation • Transducer: Temperature compensated strain gauges mounted on a stainless steel cantilever beam • Type: Cu-Ni foil with polyamide carrierbase • Gauge Resistance: 350 Ohms (Nominal) • Gauge Length: 6 mm • Gauge Width: 2.4 mm, Gauge Base: 12.5 mm x 4.3 mm, Gauge Factor: 2:1(approx.) • Configuration: Bridge with two arms as strain gauges | 03 nos. |
| 12. | Thermocouple based Temperature measurement | Thermocouple and RTD based Temperature measurement with ON/OFF controller of a system | 03 nos. |
| 13. | PID trainer kit | Closed loop temp control of an Oven with RTD sensor and PID Kit for measurement of P,I, PI & PID through oscilloscope. | 02 nos. |
| 14. | Microprocessor / Microcontroller based DC motor control | DC motor 1/4HP, 220V, 1500rpm with mechanical loading arrangement, facility for measurement of SCR triggering in oscilloscope, zero crossing detector etc. | 02 nos. |
| 15. | Fuzzy logic trainer | <ul style="list-style-type: none"> • DC Power Supply • Display Meters • PC Labview Software Based • Fuzzy Logic Controller: - A. • Fuzzy Software Controller, • Process Monitoring Mode, FuzzificationMode, Defuzzifier • B. Computer Interface Adaptor | 01 no. |
| 16. | Synchros (Trainer Kit) | <ul style="list-style-type: none"> • Synchro transmitter | 02 nos. |

Total Estimated Amount: 16,70,000.00 (Rupees Sixteen Lakh Seventy Thousand Only) plus applicable GST.

EMD: Prospective firms should submit EMD amounting to Rs. 40,000.00 (Rupees Forty Thousand Only) favouring "Indian Maritime University – Kolkata Campus" payable at Kolkata in the form of Demand Draft drawn on any Nationalised / Scheduled Bank. EMD may be exempted upon submission of the valid MSME / NSIC Registration Certificate only.

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1. The quotations/bids duly sealed, signed & completed in all respects should be deposited in the Tender Box kept at the office of the Deputy Registrar (Room No. 130) or can be sent by post. The incomplete quotations/bids will be treated as rejected. The quotations received after stipulated time & date will not be considered & rejected and no correspondence in this regard will be entertained.
2. Tenderers/Bidders are requested to visit the website www.merical.ac.in ; www.imu.edu.in regularly. Any changes/modifications in tender enquiry will be intimated by corrigendum through this website only.

In case, any holiday is declared by the Government on the day of opening, the tenders will be opened on the next working day at the same time.

3. The firms are required to submit the following documents duly signed and sealed:

- **Technical Bid (Cover – I)**

- i. EMD as stated above
- ii. Copy of Firm's registration, PAN Card, GST No.
- iii. Copy of Income Tax Statement for the last three financial years i.e. 2019-20, 2020-21 & 2021-22.
- iv. Copy of all authentic documents regarding firm's turnover etc. during last three Financial Years 2019-20, 2020-21 & 2021-22.
- v. Copies of Work Order towards the proof of similar supply during the last three Financial Years since 2019-20.
- vi. Copy of an undertaking stating that if the information/declaration/documents furnished in respect of eligibility criteria are found to be wrong or misleading at any stage, the firm will be liable to punitive action.
- vii. Undertaking on the letterhead that the firm is not blacklisted in any Govt. department.
- viii. Undertaking on the letterhead towards acceptance of the terms and conditions of the tender documents.
- ix. Undertaking towards Warranty and AMC as per Sl. No. 7 of the Terms & Conditions.

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• **Price Bid (Cover – II)**

Price Bid should be submitted on the letterhead of the prospective firms in the following format:

| Sl. No. | Name of the Item | Quantity (in nos.) | Rate per unit (in Rs.) | Applicable taxes per unit | HSN Code | Total rate per unit (including taxes) | Total Amount (Rs.) |
|---------|---|--------------------|------------------------|---------------------------|----------|---------------------------------------|--------------------|
| A | B | C | D | E | F | G=D+E | H=C+G |
| 1. | Hydraulic Set up for measurement of flow Pressure and Temperature | 01 no. | | | | | |
| 2. | Pressure Transducers Module Trainer | 02 nos. | | | | | |
| 3. | Temperature Transducers | 02 nos. | | | | | |
| 4. | Functioning of Mist Detector | 01 no. | | | | | |
| 5. | Operation of an Automatic Flow Pressure Level and Temperature Controller | 01 no. | | | | | |
| 6. | Linear valve Quick opening valve Equal percentage valve Plot of characteristics of all valves | 01 no. | | | | | |
| 7. | Flapper Nozzle Characteristic Trainer | 03 nos. | | | | | |
| 8. | I P Converter Trainer and P I Converter | 01 no. | | | | | |
| 9. | Valve positioner training unit with ATO ATC type diaphragm actuator | 01 no. | | | | | |
| 10. | LVDT Trainer | 03 nos. | | | | | |
| 11. | Strain Gauge Trainer kit | 03 nos. | | | | | |
| 12. | Thermocouple based Temperature Measurement | 03 nos. | | | | | |
| 13. | PID Trainer Kit | 02 nos. | | | | | |
| 14. | Microprocessor Microcontroller based DC Motor Control | 02 nos. | | | | | |
| 15. | Fuzzy Logic Trainer | 01 no. | | | | | |
| 16. | Synchros Trainer Kit | 02 nos. | | | | | |

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4. The Price Bids of the technically qualified bidders only will be opened after shortlisting of techno-commercially acceptable bidders with due information through emails.
5. If the bidder is a Micro or Small Enterprise as per latest definitions under MSME rules, the bidder shall be exempted from the requirement of "Bidder Turnover" criteria and "Experience Criteria". If the bidder is OEM of the offered products, it would also be exempted from the "OEM Average Turnover" criteria. In case any bidder is seeking exemption from Turnover / Experience Criteria, the supporting documents to prove his eligibility for exemption must be uploaded for evaluation by the buyer.
6. If the bidder is a Startup, the bidder shall be exempted from the requirement of "Bidder Turnover" criteria and "Experience Criteria". If the bidder is OEM of the offered products, it would also be exempted from the "OEM Average Turnover" criteria. In case any bidder is seeking exemption from Turnover / Experience Criteria, the supporting documents to prove his eligibility for exemption must be uploaded for evaluation by the buyer.
7. Experience Criteria: In respect of the filter applied for experience criteria, the Bidder or its OEM {themselves or through reseller(s)} should have regularly manufactured/supplied same or similar Category Products to any Central / State Govt. Organization / PSU / Public Listed Company / Private Organizations for number of Financial years as indicated above in the bid document before the bid opening date. Copies of relevant contracts to be submitted along with bid in support of having supplied some quantity during the Financial years taken together as indicated above. In case of bunch bids, the category of primary product having highest value should meet this criterion.
8. Purchase preference to Micro and Small Enterprises (MSEs): Purchase preference will be given to MSEs as defined in Public Procurement Policy for Micro and Small Enterprises (MSEs) Order, 2012 dated 23.03.2012 issued by Ministry of Micro, Small and Medium Enterprises and its subsequent Orders/Notifications issued by concerned Ministry. If the bidder wants to avail the Purchase preference, the bidder must be the manufacturer of the offered product in case of bid for supply of goods. Traders are excluded from the purview of Public Procurement Policy for Micro and Small Enterprises. In respect of bid for Services, the bidder must be the Service provider of the offered Service. Relevant documentary evidence in this regard shall be uploaded along with the bid in respect of the offered product or service. If L-1 is not an MSE and MSE Seller (s) has/have quoted price within L-1+ 15% (Selected by Buyer) of margin of purchase preference /price band defined in relevant policy, such Seller shall be given opportunity to match L-1 price and contract will be awarded for 25%(selected by Buyer) percentage of total QUANTITY.

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9. Estimated Bid Value indicated above is being declared solely for the purpose of guidance on EMD amount and for determining the Eligibility Criteria related to Turn Over, Past Performance and Project / Past Experience etc. This has no relevance or bearing on the price to be quoted by the bidders and is also not going to have any impact on bid participation.

Terms & Conditions:

1. The Cover I (Technical Bid) shall be addressed to "The Dy. Registrar, Indian Maritime University - Kolkata Campus" and should be duly super scribed as "Cover-I-Technical Bid towards Supply and Installation of Experimental Setups for the Control Engineering Laboratory of IMU-KC" and sealed properly. Name and Address of the bidder shall also be written / printed on the cover.
2. The Cover II (Price Bid) shall be addressed to "The Dy. Registrar, Indian Maritime University - Kolkata Campus" and should be duly super scribed as "Cover-II-Price Bid towards Supply and Installation of Experimental Setups for the Control Engineering Laboratory of IMU-KC" and sealed properly. Name and Address of the bidder shall also be written / printed on the cover.
3. Main Cover Both the "Cover I" and "Cover II" shall be placed inside the main cover, which shall be addressed to "The Deputy Registrar, Indian Maritime University - Kolkata Campus P-19, Taratala Road, Kolkata: 700088, West Bengal, India" and the main cover should be duly super scribed as "Tender towards Supply and Installation of Experimental Setups for the Control Engineering Laboratory of IMU-KC" and sealed properly.
4. **Scope of Supply:**
Scope of supply (Bid price to include all cost components): Supply Installation Testing Commissioning of Goods and Training of operators and providing Statutory Clearances required (if any).
5. **Sample Clause:**
After award of contract – Successful Bidder shall have to get advance sample approved from buyer before bulk manufacturing / starting bulk supplies. Successful Bidder shall submit 16 samples for Buyer's approval, within 07 days of award of contract. Buyer shall, as per contract specifications framework, either approve the advance sample or will provide complete list of modification required in the sample within 5 days of receipt of advance sample. Seller shall be required to ensure supply as per approved sample with modifications as communicated by Buyer. If there is delay from buyer side in approval of advance sample.
The delivery period shall be refixed without LD for the period of delay in sample approval. In case, the sample is found to have major deviations / not conforming to the Contract specifications, the buyer at its discretion may call for fresh samples for approval before allowing bulk supplies or may terminate the contract after notifying the deviations to the seller.

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Unless otherwise provided in the contract, all samples required for test shall be supplied by the contractor free of cost. Where under the contract, the contractor is required to submit an advance sample, any expenses incurred by the contractor on or in connection with the production of stores in bulk, before the sample has been approved unconditionally shall be borne by the Seller and he shall not claim any compensation in the event of such sample being found unacceptable by the Buyer / Consignee.

6. The Purchaser reserves the right to increase or decrease the quantity to be ordered up to 25 percent of bid quantity at the time of placement of contract. The purchaser also reserves the right to increase the ordered quantity by up to 25% of the contracted quantity during the currency of the contract at the contracted rates. Bidders are bound to accept the orders accordingly
7. **Service & Support:**
Availability of Service Centre: Bidder/OEM must have a Functional Service Centre in the State of each Consignee's Location in case of carry-in warranty. (Not applicable in case of goods having on-site warranty). If service center is not already there at the time of bidding, successful bidder / OEM shall have to establish one within 30 days of award of contract. Payment shall be released only after submission of documentary evidence of having Functional Service Centre.
8. **Warranty & AMC:**
Bidder / OEM has to give an undertaking that after expiry of warranty period, it will provide AMC Service for next 1 year for the offered products at the rate not more than 7% of contract price per annum. Buyer reserves the right to enter into an AMC agreement (covering preventive maintenance and servicing) with the Successful Bidder / OEM after expiry of the Warranty period at rate as mentioned above and the payment for the AMC charges would be made Quarterly after rendering of the AMC Services of the relevant AMC period. Performance Security of the successful bidder shall be forfeited if it fails to accept the AMC contract when called upon by the buyer. The original Performance Security of contract will be returned only after submission and verification of AMC Performance Security for 2% of total AMC value valid up to AMC period plus 2 months (if there is no other claim). (Undertaking of acceptance to be submitted along with the Technical Bid). **Warranty – one year from the date of SITC.**
9. **Successful bidder will have to submit 3% of contract value for performance security in form of PBG/NEFT/Demand Draft/any government approved performance guarantee as per GFR 2017 in favour of Indian Maritime University – Kolkata Campus with the validity of 14 months.**
10. The rates quoted should be comprehensive and inclusive of all delivery charges, installation, commissioning and trial run but excluding taxes which should be stated separately.
11. Submission of multiple bids by a single firm will lead to rejection of the bids and IMU-KC may black list such firms from future participation
12. Whole work should be completed within 30 days from the date of issue of the Purchase Order failing which LD @ 0.5% per week or part of the week may be imposed upto a maximum of 10% of the value of the Purchase Order.

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13. Delivery of the above items should be made at IMU - Kolkata Campus at P-19, Taratala Road, Kolkata 700 088.
14. Rates quoted should be valid for a period of 2 months from the issuance of the tender documents.
15. Payment will be made through NEFT after successful SITC of the equipments.
16. Cancellation of Tender: Notwithstanding anything specified in this bidding document, Indian Maritime University – Kolkata Campus at its sole discretion, unconditionally and without assigning any reason, reserves the right:
 - a. To accept OR reject lowest bid or any other bid or all the bids.
 - b. To accept any bid in full or in part.
 - c. To reject the bid offer not confirming to the tender's terms.
 - d. To give purchase preference to Public Sector undertakings when applicable as per Govt. Policy / Guidelines.



O.I.C. – Purchase