

**TENDER DOCUMENT**

**FOR**

**PROCUREMENT OF LAB EQUIPMENT**

**FOR**

**DEPARTMENT OF ELECTRONIC  
ENGINEERING**

**MEHRAN UNIVERSITY**

**OF**

**ENGINEERING AND TECHNOLOGY**

**JAMSHORO**

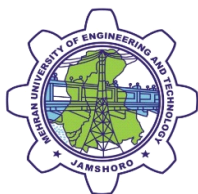
**SINDH- PAKISTAN**

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<b>B.O.Q FOR PROCUREMENT OF LAB EQUIPMENT FOR VARIOUS LABORATORIES OF DEPARTMENT OF ELECTRONIC ENGINEERING, MUET, JAMSHORO.</b>
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<b>PINK</b>
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# MEHRAN UNIVERSITY OF ENGINEERING & TECHNOLOGY,

JAMSHORO - 76062, SINDH, PAKISTAN

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ISO 2001:2008  
CERTIFIED

**DEPUTY DIRECTOR  
(Procurement)**

**“SAY NO TO CORRUPTION”**

No. & Dated: DD(Proc.)/MUET/JAM/128, 30-06-2016

## **NOTICE INVITING TENDERS**

All the prequalified Contractors / firms / parties / suppliers / Manufacturers, Sole Distributors meeting eligibility criteria, viz. having registration with Federal Board of Revenue (FBR) for Income Tax, Sales Tax in case of procurement of goods, registration with the Sindh Revenue Board in case of procurement of works and services and registration with Pakistan Engineering Council as the case may be and are not black listed in any procuring agency or authority, are invited to participate in sealed percentage / item rate tender for the following works:

S.#	Name of Work	Tender Fee	Completion Time	Earnest Money	Date of Purchase	Date of Submission of Bids	Purchase From
1	Procurement of Lab Equipment for various laboratories of Department of Electronic Engineering	3000/-	10 Months	5%	11-07-2016 To 09-08-2016	10-08-2016	Deputy Director (Procurement)
2	Procurement of Lab Equipment for various laboratories of Department of Chemical Engineering	3000/-	10 Months	5%	11-07-2016 To 09-08-2016	10-08-2016	Deputy Director (Procurement)
3	Procurement of Lab Equipment for various laboratories of Department of Mining Engineering	3000/-	10 Months	5%	11-07-2016 To 09-08-2016	10-08-2016	Deputy Director (Procurement)
4	Procurement of Lab Equipment for various laboratories of Department of Industrial Engineering & Management	3000/-	10 Months	5%	11-07-2016 To 09-08-2016	10-08-2016	Deputy Director (Procurement)
5	Procurement of Lab Equipment for various laboratories of Department of Metallurgy & Materials Engineering	3000/-	10 Months	5%	11-07-2016 To 10-08-2016	11-08-2016	Deputy Director (Procurement)
6	Procurement of Lab Equipment for various laboratories of Department of Architecture	3000/-	10 Months	5%	11-07-2016 To 10-08-2016	11-08-2016	Deputy Director (Procurement)
7	Procurement of Lab Equipment for various laboratories of Institute of Petroleum & Natural Gas Engineering	3000/-	10 Months	5%	11-07-2016 To 10-08-2016	11-08-2016	Deputy Director (Procurement)

The terms and conditions are given as under:-

- The tender documents can be had from office of the Deputy Director (Procurement) or can be downloaded from SPPRA website i.e. [www.pprasindh.gov.pk](http://www.pprasindh.gov.pk) and University website [www.muet.edu.pk/tenders-notice](http://www.muet.edu.pk/tenders-notice) on the payment noted above (non-refundable) on any working day except the day of opening of tenders. The sealed tender on prescribed proforma alongwith 5% earnest money of total bid in the form of Pay Order in favour of the Deputy Director (Procurement) for Sr. No. 01 to 04 by 10-08-2016 upto 10.30 (A.M) and same will be opened on the same day @ 11.00 (A.M) and for Sr. No. 05 to 07 by 11-08-2016 upto 10.30 (A.M) and same will be opened on the same

day @ 11.00 (A.M) in respective office, in presence of the Contractors / Suppliers / representatives, who so ever will be present at that time. In case of any unforeseen situation resulting in closure of office on the date of opening or if Government declares Holiday the tender shall be submitted / opened on the next working day at the same time & venue. Any Conditional or un-accompanied of the earnest money, tender will not be considered in the competition.

02. The Method of Procurement is Single Stage - One Envelope Procedure.
03. The Bidders should have atleast 03 years successful experience of same service of any university or large organization.
04. The Bidders should register with tax paying agency which would be verified by concerned agencies.
05. The Bidders should have atleast Rs. 5,000,000.00 annual turnover which would be verified by bank statement.
06. A Corporate Certificate / Competency Certificate of the Manufacturers regarding installation, testing, commissioning & training of equipment be attached

***The Procuring Agency reserves the right to reject any or all bids subject to relevant provisions of SPP Rules, 2010 and may cancel the bidding process at any time prior to the acceptance of a bid or proposal under Rule-25" of said Rules.***

**Sd/-**

**Deputy Director (Procurement),**  
Mehran University of Engg. & Tech. Jamshoro,  
Phone No. 022-2109010 Fax: 022-2771403  
Email: nadeem.soomro@admin.muet.edu.pk

## ARTICLES OF AGREEMENT

**This Agreement** made this \_\_\_\_\_ day of \_\_\_\_\_ 2016, by and between the Vice-Chancellor, Mehran University of Engineering and Technology, located at Jamshoro, Sindh, including his successors in office and Assignees / Agents, acting through the Director (Works & Services), Mehran University of Engineering & Technology, hereinafter called the “**University**”, of the one part,

**And** \_\_\_\_\_ of  
(name and designation of the authorized person), located  
at \_\_\_\_\_, hereinafter called the  
“**Contractor**” which expression shall include their successors, legal representatives of the  
second part.

Whereas the **University** requires Equipment at Jamshoro, and whereas the **Contractor** has agreed to supply, install, put into operation and demonstrate the working of the said Equipment valued at Rs. \_\_\_\_\_ (in figures and words) in the period of \_\_\_\_\_ months, subject to the terms and conditions set forth, hereinafter, which have been accepted by the **Contractor**.

(amount in figures and words)

**Now this Agreement witnesses as follows:**

1. In this agreement words and expressions shall have the same meanings as are respectively assigned to them in the **Conditions of Contract** hereinafter referred to.
2. The following documents which, for the purpose of identification, have been signed by \_\_\_\_\_ on behalf of the **Contractor**, and by  
(name and designation of the authorized person)  
\_\_\_\_\_ on behalf of the **University**, all of  
(name and designation of the authorized person)  
which shall be deemed to form and be read and construed as a part of this **Agreement** viz.:
  - a) Articles of Agreement;
  - b) Instructions to Tenderers;
  - c) Conditions of Contract;
  - d) Contractor’s Offer including the relevant correspondence prior to signing of this Agreement with all Annexures duly filled in;
  - e) The specifications of the equipment; and
  - f) Bill of Quantity with prices.

3. In consideration of the payment to be made to the Contractor, the **Contractor** hereby **covenants** with the University to supply, deliver, install, put into operation and demonstrate the working of the Equipment in conformity in all respects of the Contract & the order form No. \_\_\_\_\_.
4. The **University** hereby **covenants to pay** the Contractor in consideration of the supply, delivery, installation, putting into operation and demonstration of the working of the Equipment the contact price in the manner prescribed by the Contract and approved by the University.

**In Witness Whereof** the parties have hereunto set their respective hands and seals, the day, month and year first above written.

**WITNESSES:**

University\_\_\_\_\_

Contractor\_\_\_\_\_

Witness No.1:

Witness No.1:

Signature:\_\_\_\_\_

Signature:\_\_\_\_\_

Name: \_\_\_\_\_

Name: \_\_\_\_\_

Designation: \_\_\_\_\_

Designation: \_\_\_\_\_

Witness No.2.

Witness No.2:

Signature:\_\_\_\_\_

Signature:\_\_\_\_\_

Name: \_\_\_\_\_

Name: \_\_\_\_\_

Designation: \_\_\_\_\_

Designation: \_\_\_\_\_

## INSTRUCTIONS TO TENDERERS

The Mehran University of Engineering and Technology, Jamshoro, Sindh, intends to purchase Equipment under the approved schemes. The purchase will be financed through the cash provided by the Government of Pakistan. This tender is issued for the supply, installation, putting into operation and demonstration of the working of the Equipment as per the Schedule of requirements given in this Tender Document.

### **PREPARATION OF TENDER.**

#### **1. Language of Tender**

The **Tender** alongwith any accompanying literature shall be prepared in **English** language only:

#### **2. Submission of Tender**

- a) The **Tender** shall be enclosed in a double cover. The outer cover shall bear the address of the Director (Works & Services), Mehran University of Engineering and Technology, Jamshoro, Sindh, without any indication that it encloses a tender. The inner cover shall be marked with the title of the Tender, number of invitation to the Tender and the date of opening of the Tender, and **must be sealed**.
- b) The **Form for Tender**, (Annexure-A) **Tender Particulars (Annexure-B)** and **Forms of Schedule to Tender** (Annexure "C1"&"C2") enclosed herewith, shall be submitted in duplicate. The authorized person signing the tender documents must state his full name and authorized position designation underneath his signature.
- c) The **erasing and/or alterations**, if any, in the Tender shall be authenticated by the authorized person by his full signature.
- d) The **Tender** shall be accompanied with the **original quotations** from the manufacturers, in case the Tender is submitted through their authorized agents or distributors, and shall be supported by credentials establishing the experience and standing of the manufacturers and / or their authorized agents or distributors.
- e) A **Corporate Certificate / Competency Certificate of the Manufacturer** regarding installation, testing, commissioning & training of equipment be attached
- f) **Ambiguous and incorrect answers** and/or incorrect filling of Tender Documents will render the tender liable to rejection.
- g) **Quotations** through cable, telegraph, telex, fax, or e-mail will not be considered.

- h) The tenders shall not rely on any **interpretation or correction** given by any person except the written **addenda and/or corrigenda** to documents issued by the Director (Works & services), Mehran University of Engineering and Technology, Jamshoro, Sindh.

### 3. **Bid Bond and Contract Performance Bond**

- a) The tenderer shall enclose with his/her tender a **Bid Bond** on requisite stamp paper, as per **Annexure “D”** to this Tender Document, issued by a scheduled/commercial bank doing business in Pakistan, for an amount equivalent to **5% of the total cost** of the Lab Equipment offered as per the Tender submitted by him/her, or Rs. 100,000.00 (One hundred thousand), whichever is more. The Bid Bond shall be in favor of the Vice Chancellor, Mehran University of Engineering and Technology, Jamshoro, including his successor in office and assignees acting through the Director (Works & services), Mehran University of Engineering and Technology. The bond so furnished shall remain **valid for a period 28 days beyond the period of validity of the Tender** or till it is revalidated/extended for a period mutually agreed upon by the tenderer and the Director (Works & services), Mehran University of Engineering and Technology.
- b) As soon as an award is made, the provisions in paragraphs **c), d) and e)**, hereunder, shall **operate**.
- c) If the Tender is **rejected**, the Bid Bond will be returned to the tenderer as soon as possible after rejection.
- d) The **successful bidder** shall have to give a **Contract Performance Bond**, as per **Annexure “E”** to this Tender Document, to the extent of **5% of the total value** of the contract on the same conditions as the Bid Bond. The Performance Bond shall be retained by the Director (Works & services), Mehran University of Engineering and Technology, till the completion of the guarantee period as per Clause 23 of the Conditions of Contract.

### 4. **Quality of Stores.**

- a) The Equipment and other relevant materials (hereinafter called **“Stores”**) quoted and supplied against this “Invitation to Tender” shall be strictly in accordance with the **Specifications** attached with this Tender Document. The Stores shall be the product of an established manufacturer shall conform to internationally acceptable commercial standards, and shall be a model that has been successfully operated over a reasonable period of time in educational institutions R&D organizations, or relevant industry.
- b) In Tenderers must also warrant the use of best material in the making of the stores. by thefind that the Specifications for any items of the Stores are lacking in details, they may give their own proposals with detailed specifications, preferably three alternate proposals if possible, for such items in Annexure “F”.



- c) The Stores offered by the tenders must be of a quality suitable for the purposes and operations for which they are required, and must be capable of rendering the required performance and services at site in the local conditions of extreme tropical climate, air, dust, water, power and fuel at Jamshoro.
- d) The Hardware for operation of the Stores will be made available by University.
- e) The electric supply for operation of the Stores will be made available at 220 volt single phase, or 380 volt three phase, and 50 cycles.
- f) The Stores offered shall be complete with their standard accessories and must be accompanied by their normal instructions book/manual.
- g) Wherever possible or feasible, each item of Stores offered must have its own protection devices, e.g, overload protection by circuit breakers or fuses, or voltage stabilizer for electric equipment.
- h) Unless stipulated otherwise in the specifications for any item, the Stores conforming to ASA, SAE, SSI or DIN will be acceptable.
- i) The successful bidders may be asked to supply list of spares for 5 years satisfactory operation of any item of the Stores, prior to award of the contract.

5. **Literature.**

The tenderers must furnish with their bids catalogues giving full technical details of the Stores to enable the University to check their offers technically against the prescribed specifications failing which the offers will be liable to rejection.

6. **Principals Name, Certificate and Invoice.**

- a) The tenderers are required to mention in their quotations/offers the name and address of their Principals along with a certificate authorizing them (tenderers) to quote on their (Principals) behalf as under:  
“This is to certify that M/s \_\_\_\_\_ located at \_\_\_\_\_ have obtained quotations from us against tender inquiry No. \_\_\_\_\_ dated \_\_\_\_\_ from Mehran University of Engineering and Technology, Jamshoro, due for opening on \_\_\_\_\_ and have agreed to make available the Equipment on the quotations and terms and conditions of the tender”.

The above condition does not apply to the manufacturers bidding directly.

- b) The tenderers must also furnish along with their offers their Principals original Proforma Invoice failing which their offers will be rejected.

7. **Country of Origin.**

The tenderers must state in his Tender the country of origin of the Stores offered.

8. **Alternative Proposal.**

If any tenderer elects to submit alternative proposal(s) complete information on the alternative items including all data relating to technical specifications in Vol. I, II & III shall be given as per Annexure “F”.

9. **Prices.**

- a) **CATEGORY-‘A’**      **Stores Manufactured/Available in Pakistan without Involving Import.**

The prices quoted must be total per unit in Pakistani Rupees as shown in **Annexure “C-1”** and shall include:

- i. All charges for packing, marking, handling, insurance, inspection, guarantees, freight/transportation, agent’s commission; and all duties, taxes, levies, octrois etc; and.
- ii. The cost of installation, putting into operation and demonstration of the working of the Equipment in the Laboratories of Electronic Engineering Department of the University.

- b) **CATEGORY-“B”**.      **Stores Imported from approved Countries.**

The prices must be quoted for each item of Stores in **Annexure-“C2”** separately for each of the PARTS given below:

**PART-1. Payment in Foreign currency.**

The C&F prices quoted by the Principals in the currency of the country of origin.

For the purpose of comparison, the prices quoted shall be converted to equivalent prices in Pakistani Rupees on the basis of the official bank rate prevalent on the date of opening of the Tender.

**PART-2 Payment in Pakistani Rupees.**

- (i) The agent’s/supplier’s commission in Pakistani Rupees.
- (ii) The insurance charges. The insurance will be arranged by the Contractor through the University with Pakistan Insurance Corporation. The University will assist the Contractor in obtaining the insurance at concessional rates, if any, as allowed by the Government.
- (iii) The cost of installation, putting into operation and demonstration of the working of the equipment in the Laboratories of the University in Pakistani Rupees.
- (iv) All the charges pertaining to handling and clearance of the Stores at the port including all taxes, levies, octrois etc. but excluding the customs duties for the payment of which the University is exempted by the Government. However, if the customs duties are charged for any items of the Stores for which the Government the exemption, the University will make the payment.

- (v) The transportation charges for transporting the Stores from the port to the Electronic Engineering Department of the University including the charges for loading the Stores at the port and unloading the same at the University.

For the purpose of evaluation/comparison of bids, as stated in Clause-15, the total price for the Stores under this Category shall be the sum of the amounts mentioned for Parts 1 & 2 above.

- (c) In addition to what is stated in para a) & b) above, the prices given in Annexure C1 & C2 shall also include the following for the Stores of both the Categories-A & B.
  - (i) Supply, detailing, manufacture, factory testing, export preparation and all costs incidental to shipping/transport up to the stage of installation in the Electronic Engineering Department of the University.
  - (ii) Responsibility for any loss and/or damage at any stage from manufacture to installation in the Electronic Engineering Department of the University.
  - (iii) Provision for clean on boards bills of landing.
  - (iv) The cost of export taxes, fees and charges levied and out going incurred on exporting goods in the country of origin.
  - (v) The expenses on account of the certificate of origin, invoices or any other documents issued in the country or origin.

#### **10. Validity of Prices/Tender**

- a) The prices quoted shall be valid for a period of at least 120 days from the date of opening of the tender.
- b) Until the final Contract is executed, the successful bidder shall be bound by the terms and conditions of this Tender Document.

#### **11. Acceptance of the Terms**

- a) The submission of the tender against this tender inquiry by the tenderer means that the tenderer has read and accepted the terms and conditions relating to all the tender documents and annexures, and that he/she have thoroughly examined the specifications and particulars in the tender inquiry. Further the tender shall be deemed to be fully aware of the nature of the Stores and the purpose for which they are required and shall be bound to accept the Contract if placed with him/her on the basis of the prices and of the delivery schedule as indicated in Clause 12 hereof within the validity of his/her Tender.

- b) If the Tender is awarded in favour of Proprietor / Principals who has no authorized agent or distributor in Pakistan, he/she shall have to appoint a distributor or nominee for the purpose of successful completion of the contract and to provide after-sales service.

**12. Delivery Period.****i. Shipment of Imported Items.**

- a) The shipment of the items of Stores which are to be imported shall be started as early as possible, the shipment schedule shall be submitted to the Director (Works & Services), Mehran University, and shall be negotiable and subject to approval by the University.
- b) The tenderer must indicate in his/her offer the port from where the Stores will be shipped.

**ii. Delivery Period.**

- a) The entire Stores must be delivered, installed and put into operation in the Electronic Engineering Department of the University as early as possible after receiving the letter of award of the Contract.
- b) The Tenderer shall give in the offer his/her own schedule for the delivery and installation of various items of the Stores which shall be negotiable and subject to approval of the University.

**iii. Delay in the Delivery of the Stores.**

- a) For the Stores delayed beyond the delivery period, as specified in the Contract, or as approved by the University as stated in Clause 12 ii b) above, there shall be levied liquidated damages as specified in Clause 22 of the Conditions of Contract given in this Tender Document.
- b) The liquidated damages may be waived fully or partially by the Director (Works & Services), with the approval of the Vice Chancellor of the University, if there are reasonable grounds for such a delay.

**13. Negotiations.**

Under no circumstances will the negotiations take place with any tenderer with regard to Specifications and Prices quoted and read out at the public opening of the tenders and with regard to the substance of the offer. The tenderers cannot revise their prices after the public opening of the tenders.

**14. Rights of the University**

- (a) The University reserves the right to reject any or all bids without any reason whatsoever, or not waive minor irregularities or errors in any offer. If it appears to the University that such irregularities or errors must be corrected in the offer in which they occur, the same will be corrected prior to issue of the letter of intent which may be awarded thereupon.

- (b) The University is neither bound to accept the lowest or any other offer nor is it bound to assign reason for rejection of any offer.
- c) The University reserves the right to award the contract to one bidder or divide it among several bidders.
- d) The University reserves the right to increase or decrease the quantity of the Stores at its discretion without assigning any reason whatsoever.
- e) The University reserves the right to cancel the offer of the tenderer whose bid has been found / evaluated to be the lowest if it is revealed to the University that the tenderer does not have the capability or financial resources or facilities to carry out the Contract in accordance with the terms and conditions of this Tender Document.

**15. Evaluation of Bids.**

- a) In comparing bids the University will consider, besides the prices quoted, such other factors as compliance with specifications, relative quality of Stores, past experience of the tenderer, after-sales services facilities available in Pakistan and the tenderer's capacity to perform.
- b) The evaluation criteria specifically mentioned in the specifications will also be considered for evaluation of the bids.
- c) For the purpose of evaluation, the prices to be compared shall be the total prices inclusive of all duties, taxes, freight charges etc. as stated in clause 9 titled "Prices" above.
  - (i) For the items quoted in Annexure-C-1, the total prices as mentioned in Clause-9(b) shall be compared.
  - (ii) For comparison of the items quoted in Annexure C-1 with those quoted in Annexure C-2, the total prices as mentioned in Clause-9(a) including the charges/cost packing, making, handling, insurance, inspection guarantees, clearance, freight/transportation upto the University's Electronic Engineering Department duties, taxes, levies, octrois etc.

**16. Errors in the Bids.**

- (i) Any arithmetic errors found during evaluation of bids will be rectified on the following basis:
  - a) If there is a discrepancy between the unit price and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected by the University.
  - b) If there is a discrepancy between the words and figures, the amount in figures shall prevail.

- c) If there is any discrepancy between the total tender price entered in the Articles of Agreement and the total shown in the Schedule of Prices, the amount stated in the Articles of Agreement shall be corrected by the University in accordance with the corrected schedule of Prices.
- (ii) If the tenderer does not accept the corrected amount of tender, his/her Tender will be rejected and the Bid Bond submitted with the tender shall be forfeited.

**17. Foreign Exchange for Items of Stores to be imported.**

For the items of Stores which are to be imported and for which the prices have been quoted on C&F basis in Annexure C-2, the University will arrange payment in the foreign currency, to the extent of the C&F amount, as stated in Clause 9(b), through its bank in Pakistan in accordance with the prevailing foreign exchange control rules/regulations of the Government of Pakistan.

## **CONDITIONS OF CONTRACT**

### **1. Scope of the Contract**

- a) The **Scope of the Contract** shall be the supply, delivery, installation, putting into operation and demonstration of the working of the Stores in the Electronic Engineering Department of the University at Jamshoro, Sindh, in accordance with the technical Specifications and Bill of Quantities enclosed in this Tender Document.
- b) The Contractor shall within a period of one month of the execution of the agreement furnish to the University a **detailed program** for supply and delivery of various items of the Stores for necessary approval by the University.

### **2. Definition of Terms**

In writing these Conditions of Contract, Specifications and Bill of Quantities, the following words shall have the meanings hereby indicated, unless there is some thing in the subject matter or Contract inconsistent with such constructions:

- i. **The University** shall mean the Mehran University of Engineering and Technology, Jamshoro, Sindh.
- ii. **The Vice Chancellor** shall mean the Vice Chancellor of Mehran University of Engineering and Technology, Jamshoro, Sindh, including his successor in office and assignees, empowered to act in all matters pertaining to the University either directly or through the Director (Works & Services), Mehran University of Engineering and Technology, Jamshoro.
- iii. **The Contractor or Supplier** shall mean the Tenderer (Bidder) whose Bid has been accepted by the University and shall include the Bidder's executors, administrators, successors and permitted assignees.
- iv. **The Stores** shall mean and include all the Equipment, literature, materials and articles to be provided by the Contractor under the Contract.
- v. **The Contract** shall mean the agreement signed by the Contractor for the supply, delivery, installation, putting into operation and demonstration for the working of the Stores, as stated under the Scope of the Contract above.
- vi. **The Contract Price** shall mean the sum mentioned in or calculated in accordance with the provisions of the Contract, which is to be paid to the Contractor for satisfactory execution of the Contract in accordance with these Conditions of Contract.

- vii. **The Specifications** shall mean the specifications annexed to or issued, herewith, and shall include the schedule and drawings attached hereto as well as the samples and patterns if any.
- viii. **Month** shall mean the Calendar month.
- ix. **Writing** shall include any manuscript, type-written, printed or other statement reproduced in any visible form and whether under seal or under hand.

### 3. **Contract Documents.**

- a) The term **Contract Document** shall mean the following documents which shall be deemed to form an integral part of the Contract:
  - i. Articles of Agreement;
  - ii. Instructions to Tenderers;
  - iii. Conditions of Contract;
  - iv. Contractor's Proposal / Offer including the relevant correspondences prior to signing of the agreement with all Annexures duly filled in;
  - v. The Specifications of the Stores; and
  - vi. Bill of Quantities with prices.
- b) In the event of any **conflict** between the above mentioned documents, the present Articles of Agreement and Conditions of Contract shall prevail.

### 4. **Signing of the Contract Agreement**

Within 30 days of the issue of the letter of intent, the successful bidder (bidders) will be required to **sign an agreement** with the University for the supply of such quantity, in whole or in part, of the tendered Stores as will be communicated to him / her (them) in the letter of intent.

### 5. **Packing, Marking and Handling**

- a) All the Stores, whether imported or locally manufactured / available, shall be delivered to the University at Jamshoro in **safe and secure condition** at the risk and cost of the Contractor.
- b) The packing, marking and handling shall be so arranged by the Contractor as to **prevent any loss of or damage** to the Stores.



- c) In case any of the items of the Stores are to be imported by the Contractor, the **import** shall be **arranged by the Contractor** himself / herself with such packing and marking and through such means as deemed fit by him / her for safe and secure delivery at Jamshoro. The packing of the equipment shall be the usual export packing to ensure safe journey by air, sea, rail and road, as the case may be, of the Stores to destination. Each packing shall be clearly marked in English with the following:

- i. Port of Destination: KARACHI.
- ii. Name of the Ship: \_\_\_\_\_
- iii. Name of the Consignee: DIRECTOR (WORKS & SERVICES)  
MEHRAN UNIVERSITY OF  
ENGINEERING & TECHNOLOGY  
JAMSHORO, SINDH, PAKISTAN
- i. Name of the Contractor: CONTRACTOR'S NAME & ADDRESS
- ii. Case Number & Contents: \_\_\_\_\_
- iii. Net Weight & Dimensions: (length, Breadth & Height)
- iv. Gross Weight: (Kg.)
- v. Number & Date of Contract: \_\_\_\_\_
- vi. Marking: MUET in a 6 in. x 4 in. rectangle  
**MUET**

## 6. Transportation and Shipment

### a. For Stores to be Imported

- i. All those items of Stores which are to be imported by the Contractor shall be **shipped** by whatever means the Contractor deems fit **at his / her risk and cost**. The Contractor must keep the University informed of the shipping arrangements, schedule of shipping, arrival at the port, clearance from the port, and transportation from the port to the University.
- ii. **All costs** of loading of the Stores from the wharves at port of shipment and also the cost of ship wharf age / berthing, demurrage charges, stevedoring, handling charges and other port and river dues in respect of shipment companies' vessels at the port of shipment and all other expenditure up to the stage of placing the Stores at rest on board the ship and the freight charges shall be **borne by the Contractor**.
- iii. Similarly all costs of unloading the Stores at the wharves, wharf age / berthing, demurrage, stevedoring, handling charges and other port dues at the port of arrival in Pakistan and transportation from the port up to the stage of placing the Stores position in the Electronic Engineering Department of the University shall be borne by the **Contractor**. In order to facilitate the clearance of the Stores at the port of arrival, a clearing agent will be engaged by the University, in consultation with the Contractor, who will get the Stores cleared with the assistance of the University and the Contractor, and the clearing agent's charges shall be **borne by the Contractor**.

- iv. All things being equal, **Pakistan flag ships** should be used, as far as possible, for shipment of the Stores. If no such ship is available, such other ships may be used consistent with the execution of this Contract with economy and efficiency.
- v. The Stores must be shipped **under deck**
- vi. The Contractor shall send by air mail/courier service or personally deliver 4 (four) sets of non-negotiable shipping documents direct to the Director (Works & Services), Mehran University of Engineering and Technology, Jamshoro, Sindh, so as to reach him at least 8(eight) days before arrival of the ship at the port in Pakistan.

**b. For Stores Manufactured / Available in Pakistan**

- i. All those items of the Stores which are to be manufactured in Pakistan, or are to be supplied from the locally available stocks (whether imported or manufactured in Pakistan), may be transported from the place of manufacture or availability to Jamshoro by **any mode of transportation** as deemed convenient and suitable by the Contractor at his / her risk and cost.
- ii. **All costs** of handling, loading, transportation, unloading and placing the Stores in position in the Electronic Engineering Department of the University shall be **borne by the Contractor**.

**7. Pre-shipment and After-fabrication Inspection**

- a) The **pre-shipment inspection** and / or the inspection of the Stores Principals/Proprietor at the premises, if desired by the Contractor, shall be arranged by the Contractor at his / her own cost. The responsibility for the quality, quantity, correctness and adherence to the Specifications etc. of the Stores shall lie solely and squarely on the Contractor.
- b) The University may, at its discretion, waive pre-shipment inspection and hence issue the waiver in writing so that the Stores could be shipped under manufacturer's test certificate. This waiver shall be deemed as authorization to ship for the purpose of negotiating the letter of credit under Clause 13(b)ii.
- c) The pre-shipment inspection and/or the waiver thereof shall in no way above the Contractor of any of his obligations under this Contract.

## 8. Insurance

The **Contractor shall arrange** the insurance for the Stores in whatever way he / she deems fit at his / her risk and cost. The prices quoted in the offer of the Contractor shall include the cost of insurance. The Contractor shall have to inform the University of the Insurance Arrangements made by him / her for the Stores.

## 9. On-arrival Inspection

There shall be inspection of the Stores by the representatives of the University after arrival in the Electronic Engineering Department of the University in presence of the Contractor or his authorized representatives and the representatives of the insurance company. The **inspection report**, which, inter-alia, should indicate the condition in which each item of the Stores has been received, shall be signed by the above representatives. The Contractor shall coordinate with the Director (Works & Services), Mehran University, and the insurance company for arranging the inspection at such date and time as is convenient to the above representatives.

## 10. Taking Over

Upon receipt of the equipment in the Electronic Engineering Department of the University and after inspection, as stated in Clause 9 above, the University will issue a **taking-over certificate** in respect of those items of Stores which are received in acceptable condition. The taking-over of the damaged items will be with-held until the same are repaired / replaced and are re-inspected and found in acceptable condition.

## 11. Installation and Demonstration of Stores

### a). Installation

- i) After inspection and taking over of the Stores, as stated in Clauses **9** and **10** above, the **Contractor shall install** those items of Stores which are to be permanently positioned in place in the laboratories of the University. For this purpose, the Contractor shall co-ordinate with the Director (Works & Services), Mehran University, for making arrangements for the Hardware needed for the installation.
- ii) The cost of hardware **for installation** shall be borne by the University. The Contractor shall provide, alongwith his offer, the details of the hardware needed for each item of the Stores separately. The technical and other personnel needed for installation of the Stores shall be provided by the Contractor at his cost. The entire cost of installation, configuration, application except that of the needed hardware, shall be borne by the Contractor.

**b) Demonstration**

- i) After installation of the Stores, as stated in Clause **11 a)** above, the complete **working of each item** of Stores for the purpose of performing the intended Electronic Engineering Department experiments, testing of specimens and recording of the test results etc., shall be demonstrated fully to the designated staff of the University by the Contractor or his technical personnel.
- ii) The entire **cost**, including the T.A. / D.A. of the personnel involved in the demonstration, shall be **borne by the Contractor**.

**12. Completion Certificate**

After completion of the installation and demonstration, as stated in Clause **11** above, a certificate is to be obtained by the Contractor from the concerned **Head of the Department / Director of the Institute** stating that the Stores (item-wise) have been satisfactorily installed and demonstrated by the Contractor.

**13. Terms of Payment**

The Contractor shall be paid for Stores in the following manner:

- a) CATEGORY A: **Stores Manufactured/Available in Pakistan without involving import.**
  - i. For all those items of Stores for which the completion certificate has been issued by the University, as stated in Clause **12** above, the University will pay to the Contractor total price of the items quoted by the Contractor.
  - ii. The payment for those items of Stores for which the completion certificate has not been issued by the University, as stated in Clause **12** above, will be withheld and released only after the damaged items are replaced / repaired, re-inspected and found in satisfactory condition with consequent issuance of the completion certificate. The payment will be made in the same manner as stated in Clause **13 a) i** above
- b) CATEGORY-B **Stores Imported from Approved Countries.**

The payment for this category of Stores will be made in two parts as under:-

**PART-I. Payment in Foreign currency**

- i. An irrevocable **letter of credit** of one hundred percent (**100%**) of the C&F price, in the currency quoted by the Principals, will be opened in a bank in the country of origin in favor of the Principals/Contractor within 30 days after signing the Contract.

- ii. One hundred percent (**100%**) of the letter of credit amount will be paid against presentation of the shipping documents to the bank through the above letter of credit. The required shipping documents include:
- Clean on board bill of lading;
  - Contractor's detailed invoice showing description of the Stores, specifications, quantity, unit price and total price;
  - Detailed packing list;
  - Certificate of origin of the Stores' and
  - Certificate of pre-shipment/after-fabrication inspection or authorization to ship the Stores as per Clause-7.

**PART-2.      Payment in Pakistani Rupees**

The Rupee component of the price of the Stores, as stated in Clause **9 b)** of “**Instructions to Tenderers**” will be paid to the Contractor in the following manner:

- i. For all those items of Stores for which the taking over certificate has been issued by the University, as stated in Clause **10** above, the University will pay to the Contractor seventy percent (70%) of the total price of the items quoted by the Contractor, the remaining thirty percent (30%) will be paid after presentation of the completion certificate, as stated in Clause 12 above.
- ii. The payment for those items of Stores for which the completion certificate has not been issued by the University, as stated in Clause **10** above, will be withheld and released only after the damaged items are replaced/repared, re-inspected and found in satisfactory condition with consequent issuance of the completion certificate. The payment will be made in the same manner as stated in Clause **13 a)i** above

**14.      Warranty / Guaranty**

- a) The Contractor shall **warranty** that the Stores shall be fit for the purposes and operation mentioned in the relevant clauses of the “Instructions to the Tenderers” and “Conditions of Contract”, notwithstanding the fact that the entire Stores, or any item or part of the Stores, bear or are found to bear a patent or trade mark.
- b) The Contractor shall guarantee supply of good quality Stores in accordance with the Specifications and as stated in Clauses 4 and 5 of the “Instructions to the Tenderers”. Further, the Stores shall be brand new and absolutely free from all defects in material, quality and workmanship. In case of defects, the defective Stores, or the defective parts / components of the Stores thereof, shall be replaced by the Contractor free of cost to the University within reasonable time.

**15. Breach of Contract**

In case of breach of warranty /guarantee or Contract, the **damages** suffered by the University shall be **recovered from the Contractor** out of any payment due to the Contractor and / or in accordance with the terms and conditions of the Contract Performance Bond given at Annexure “E” enclosed with this Tender Document, without notice to the Contractor.

**16. Contractor’s Default Liability**

a) The University may upon written notice of default to the Contractor **terminate the Contract** in the circumstances detailed hereunder:

- i. If in the judgment of the University, the Contractor fails to make delivery of the Stores within the time specified in the Contract Agreement or within the period for which extension has been granted by the University; and
- ii. If, in the judgment of the University, the Contractor fails to comply with any of the other provisions of the Contract.

b) In the event the University terminates the Contract, in whole or in part, as provided in Clause **16 a)** above, the University reserves the right to **purchase**, on such terms and conditions as it may deem appropriate, Stores similar to the one terminated, and the Contractor will be liable to the University for any additional costs for such **similar Stores**, and / or for liquidated damages for delay, as defined in Clause **22** of the Conditions of Contract until such reasonable time as may be required for the final supply of the Stores.

c) If the Contract is terminated, as provided in Clause **16 a)** above, the University, in addition to any other rights provided in this Clause, may require the Contractor to **transfer title** and deliver to the University under any of the following cases in the manner and as directed by the University:

- i) Any **completed Stores**; and
- ii) Such **partially completed Stores**, drawings, information and contract right (hereinafter called manufacturing material) as the Contractor has specifically produced or acquired for the performance of such parts of the Contract as has been terminated.

d) The University will **pay to the Contractor** the Contract Price for the completed Stores delivered to and accepted by the University and also for the manufacturing materials delivered and accepted.

e) In the event the University does not terminate the Contract, as provided in Clause **16 a)** above, the Contractor shall continue with the performance of his / her Contract, in which case the Contractor shall be liable to the University for **Liquidated Damages for delay** as set out in Clause 22 until the Stores are accepted.

**17. Bankruptcy**

If the **Contractor** shall become **bankrupt** or have a receiving order made against him / her or compound with his / her creditors, or being a corporation commence to be wound up, not being a voluntary winding up for the purpose of amalgamation or reconstruction, or carry on its business under a receiver for the benefit of its creditors or any of them, **the University shall** be at liberty to:

- a) **terminate the Contract** forthwith by a notice in writing to the Contractor or to the liquidator or receiver or to any person in whom the Contract may become vested, and to act in the manner provided in Clause 16 above as though the last mentioned notice has been the notice referred in such Clause and the Stores have been taken out of the Contractor's hand; and / or
- b) give such liquidator, receiver, or other person the **option of carrying out the Contract** subject to his / her providing a guarantee for the due and faithful performance of the Contract up to an amount to be determined by the University.

**18. Termination of Contract**

- a) If, for any cause as set forth in Clause **19** hereafter, the Contractor finds it impracticable to continue operation or, if owing to force majeure or to any cause beyond its control, the University finds it impossible to continue operation, then **prompt notification** in writing shall be given by the party affected to the other.
- b) If the delay or difficulties so caused cannot be expected to cease or become avoidable, or if operation cannot be resumed within six months, then either party shall have the right to terminate the Contract by giving ten **(10) days written notice** to the other.
- c) In the event of termination of the Contract under this Clause, **payment** will be made to the Contractor as follows:
  - i) The Contractor shall be paid for all the Stores for which the completion certificate has been issued, as stated in Clause 12, and for all the reimbursable expenses due and unpaid.
  - ii) The Contractor shall also be paid reasonably for any work done during the said six months period as well as for settlement of any financial commitment made in connection with proper performance of the Contract and which are not reasonably defrayed by payments under i) above.
  - iii) On termination of the contract for any cause, the Contractor shall see to the orderly suspension and termination of operations with due consideration to the interests of the University with respect to completion, safeguarding or storing of the Stores produced for the performance of the Contract and the salvage and resale thereof

## 19. Force Majeure.

**The Contractor shall not be liable** for any additional cost or for liquidated damages for delay or any failure to perform the Contract arising out of force majeure or cause beyond his / her control including acts of God, or of the public enemy, or of the Government, fires, floods, epidemic quarantine restrictions, strikes, freight embargoes and default of subcontractors due to any such cause (unless the University shall determine that the Stores to be furnished by the Contractor might reasonably have been obtained from other sources in sufficient time to allow the Contractor to meet the required time schedule), provided that the Contractor shall within ten (10) days from the beginning of such delay notify the University in writing of the **causes of the delay**. The University shall ascertain the facts and the extent of the delay and **extend the time** for completing the supplies as in its judgment the findings justify.

## 20. Rejection

- a) In the event any portion of the Stores supplied by the Contractor is found before taking over to be **defective in material or workmanship**, or otherwise not in conformity with the requirements of the Contract, the University shall have the right to either reject or require, in writing, rectification of the Stores. In the later case, the Contractor shall with utmost diligence, and at his own expense, make good the defects so specified or replace the defective Stores. If the Contractor fails to rectify or replace the rejected Stores, the University may adopt any of the following options:
  - i) **replace or rectify**, at its option, such defective Stores and charge to the Contractor the excess cost occasioned to the University plus (15%) fifteen percent; or
  - ii) acquire the said Stores **at a reduced price** considered equitable under the circumstances; or
  - iii) **terminate the Contract** as provided in Clause **18** of these Conditions of Contract.
- b) Nothing in this Clause shall affect any claim by the University under Clause **22** hereafter.

## 21. Extension of Time

If the completion of the Contract is delayed due to reason beyond the control of the Contractor, the Contractor shall without delay request the University, in writing, of his **claim** for an extension of time. The University on receipt of such request may agree to **extend the completion date** as may be reasonable in the circumstances of the case but without prejudice to other terms and conditions of the Contract.



## 22. Delay in Delivery - Liquidated Damages

- a) Should the **progress** of the Contract at any time be **lagging behind** the program agreed between the University and the Contractor, the University will notify the Contractor in writing and the Contractor shall there upon take such steps as he / she may deem fit to **expedite the progress** of the Contract. Non-issuance of this notice by the University shall not in any way absolve the Contractor of the liquidated damages as stated in Clause 22 b) below.
- b) If the Contractor **fails to complete the Contract**, in full or part, within the time laid down in the Contract Agreement or any extension thereof, there shall be deducted from the Contract Price, as **liquidated damages**, a sum of one half of one percent (**0.5%**) of **the Contract price** of each unit of the delayed Stores for each calendar week of delay subject to the maximum of five percent (5%) of the Contract Price of the unit or units so delayed, and such deduction shall be in full satisfaction of the Contractor's liability for the said failure.

## 23. Period of Guarantee

- a) The term **period of guarantee** shall mean the period of twelve (**12**) **months** from the date on which the Stores have been put into operation and demonstrated to University staff. In any case this period shall not exceed eighteen (18) months from the date of taking-over certificate.
- b) During the period of guarantee, the Contractor shall **remedy**, at his / her expense, **all defects** in design, materials, and workmanship that may develop or are revealed under normal use of the said Stores upon receiving written notice from the University; the notice shall indicate in what respect the Stores are faulty.
- c) The provisions of this Clause include all the **expenses** that the Contractor may have to incur for delivery and installation of such replacement parts, material, and equipment as are needed for satisfactory operation of the Stores at the University premises.

## 24. Non-assignment

The Contractor shall **not have the right to assign or transfer** without the prior approval of the University the benefit and obligations of the Contract or any part thereof.

## 25. Expenditure Under Contract

The Contractor shall not make any expenditure for the purpose of this Contract in any **country not authorized** by the Government of Pakistan

## 26. **Certificate Not to Affect the Rights of the University or the Contractor**

No certificate of the University on account nor any sum paid on account by the University nor any extension of time for the delivery of the Stores pursuant to Clause 19 shall affect or **prejudice the rights of the University** against the Contractor nor relieve the Contractor of his obligation for due performance of the Contract or be interpreted as approval of the Stores supplied, and no certificate shall create liability of the University to pay for the alterations, amendments, variations etc. not ordered in writing by the University or discharge the Contractor for the payment of damages or of any sum against the payment of which he / she is bound to indemnify the University nor shall such certificate nor the acceptance by him / her of any sum paid affect or **prejudice the rights of the Contractor** against the University.

## 27. **Payments Due from the Contractor**

**All costs**, ascertained damages or expenses for which under the Contract the Contractor is liable to the University may be deducted by the University from any money due or may become due to the Contractor under the Contract or may be recovered by action of law or other wise from the Contractor.

## 28. **Legal Proceedings**

The Contract and the Tender Documents are governed by the **laws of Pakistan** and no proceedings to or arising out of any of them shall be instituted in any courts other than those situated at Hyderabad and Karachi, Sindh Pakistan..

## 29. **Dispute**

Should any question or dispute arise as to the material, design, construction or delay in the supply of the Stores or the purpose or the performance for which they are required or are warranted, the University shall nominate an independent **certifier / expert** having knowledge of Equipment, etc., who will, after affording the parties to the dispute an opportunity to present their contention, and after having tests made as the certifier deems fit, certify whether there has been any breach of Contract or warranty and, if so, what sum shall be paid to the University in diminution or extinction of price, and such certificates shall be final and binding and shall not be questioned and shall be acted upon in arbitral or other legal proceedings. The award of the costs of the certifier will be within his / her own discretion and shall be recoverable from the party against which the costs are awarded.

## 30. **Arbitration**

All disputes and matters of difference whatsoever (other than those relating to the certificate of expert certifier) between the University and the Contractor relating to and arising out of the Contract and Tender Documents shall be referred to arbitration under the arbitration act 1940 with amendments and re-amendments thereof, each party nominating its own arbitrator. The umpire will be nominated by the arbitrators within the first three arbitral hearings. The **award of the arbitrators or of the umpire shall be final and binding** upon the parties. The arbitral proceedings shall be held at Jamshoro, Sindh Pakistan.

**FORM OF TENDER**  
(LETTER OF OFFER)

Tender Reference No. \_\_\_\_\_ Dated \_\_\_\_\_

Name of Contract: **Supply, Installation, Putting into Operation and Demonstration of Equipment at laboratories of Electronic Engineering Department of Mehran University of Engineering & Technology, Jamshoro, Sindh**

The Director (Works & Services)  
Mehran University of Engineering & Technology  
JAMSHORO, SINDH

Dear Sir,

1. Having examined the Tender Documents including Instructions to Tenderers, Conditions of Contract, Specifications, Drawings, Schedule of Prices and Addenda Nos. \_\_\_\_\_ for the execution of the above-named Contract, we, the undersigned, being a company doing business under the name and address \_\_\_\_\_ and being duly incorporated under the laws of Pakistan hereby offer to execute and complete such Contract and remedy any defects therein in conformity with the said Documents including Addenda thereto for the Total Tender Price of Rs. \_\_\_\_\_ (in figures and words) or such other sum as may be ascertained in accordance with the said Documents.
2. We understand that all the Schedules attached hereto form part of this Tender.
3. As security for due performance of the undertakings and obligations of this Tender, we submit herewith a Bid Bond referred to in Clause 3 of the Instructions Tenderers and as per Annexure "D", in the amount of Rs. \_\_\_\_\_ (in words and figures) drawn in favor of or made payable to Mehran University of Engineering and Technology, Jamshoro, and valid for a period of 28 days beyond the period of validity of this Tender.
4. We undertake, if our Tender is accepted, to complete the whole of the work comprised in the above-named Contact within the time stated in Clause 12 of the Instructions to Tenderers.
5. We agree to abide by this Tender for the period of 120 days beyond the date of opening of the Tender, and it shall remain binding upon us and may be accepted at any time before the expiration of this period.
6. Unless and until a formal Contract Agreement is signed, this Tender, together with your acceptance thereof, shall constitute a binding contract between us.
7. We undertake, if our Tender is accepted, to execute the Contract Performance Bond referred to in Clause 3 of the Instructions to Tenderers and as per Annexure "E" for the due performance of the Contract.

8. We understand that you are not bound to accept the lowest or any Tender you may receive.
9. We do hereby declare that this Tender is made without any collusion, comparison of figures or arrangement with any other person or persons making a Tender for the above-named Contract.
10. We confirm, if our Tender is accepted, that all partners of the joint venture shall be liable jointly and severally for the execution of the Contract and the composition or the constitution of the joint venture shall not be altered without the prior consent of the Vice Chancellor, Mehran University of Engineering and Technology, Jamshoro. (Please delete this clause in case of Tender from a single firm)

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 2016

Signature \_\_\_\_\_ in the capacity of \_\_\_\_\_ duly authorized

to sign Tender for and on behalf of \_\_\_\_\_  
(Name of Tenderer in Block Capitals)

Address: \_\_\_\_\_  
\_\_\_\_\_

**Witness:**

Name: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_

Occupation: \_\_\_\_\_

**TENDER PARTICULARS**

**THE TENDERERS MUST SUPPLY THE FOLLOWING SPECIFIC INFORMATION FOR EACH ITEM OR GROUP OF ITEMS OF THE STORES:**

**1. Conformation of Stores:**

Whether the Stores offered conform to the particulars specified in the Schedules; if not, details of deviations must be stated in Annexure "F".

**2. Manufacturing Details:**

- (i) Brand of Equipment.
- (ii) Name and address of Manufacturer; and
- (iii) Country of origin of Stores.

**3. Delivery Schedule: `**

- (i) Earliest date by which delivery can be affected;
- (ii) Complete schedule of delivery; and
- (iii) If the delivery period is different for different items, it must be indicated item wise.

**4. Packing Specification:**

Whether the specifications for packing given in the Tender Documents will be adhered to.

ANNEXURE "C1"

**FORM OF SCHEDULE TO TENDER FOR STORES**  
**MANUFACTURED/AVAILABLE IN PAKISTAN WITHOUT INVOLVING IMPORT.**

Due by \_\_\_\_\_ hours on \_\_\_\_\_  
(time) (date) (month) (year)

SCHEDULE TO TENDER NO. \_\_\_\_\_ DATED \_\_\_\_\_

The Tender will be opened at \_\_\_\_\_ hours on \_\_\_\_\_  
(time) (date) (month) (year)

Delivery on or before \_\_\_\_\_  
(date) (month) (year)

**Rates and amount to be quoted in Pakistani Rupees**

S.No.	Code/ Item No.	Description Of Stores	Detailed Specifications Of Stores with Model No.	Quantity Of Stores.	Unit	Rate Per Unit	Total Price.
1	2	3	4	5	6	7	8

**It is certifies that:**

- The Stores offered above conform in all respects with the particulars/specifications given in the Tender Documents' and
- All the terms and conditions of the Tender Documents are acceptable to us.

\_\_\_\_\_  
(signature of the authorized person)

\_\_\_\_\_  
(name of the authorized person)

**SEAL**

\_\_\_\_\_  
(name of the Tenderer)

**ANNEXURE “C2”**

**FORM OF SCHEDULE TO TENDER FOR STORES**  
**IMPORTED FROM APPROVED COUNTRIES.**

Due by \_\_\_\_\_ hours on \_\_\_\_\_  
(time) (date) (month) (year)

SCHEDULE TO TENDER NO. \_\_\_\_\_ DATED \_\_\_\_\_

The Tender will be opened at \_\_\_\_\_ hours on \_\_\_\_\_  
(time) (date) (month) (year)

Delivery on or before \_\_\_\_\_  
(date) (month) (year)

**PART 1.** The rates quoted in the Table below must be on C&F basis.

S. No.	Code/ Item No.	Description Of Stores	Detailed Specifications Of Stores with Model No.	Quantity Of Stores.	Unit	Rate Per Unit	Currency	Total C&F Price	Country of Origin
1	2	3	4	5	6	7	8	9	10

**PART 2.** The rates quoted in the Table below must be in Pakistani Rupees

S.No.	Code/ Item No.	Description of Stores	Quantity Of Stores.	Unit	Rate Per Unit	Total Price.
1	2	3	5	6	7	8

(Continued on the next page)

## ANNEXURE “C2”

### NOTE:

In the Table below, the columns 1 to 5 and 8 are to be filled in by the Tenderer before submitting the Tender, while the columns 6,7 and 9 are to be filled in jointly by the Director (Works & Services), Mehran University of Engineering and Technology, or his representative, and the Tenderer, or his representative, after opening of the Tender.

S. No.	Code/ Item No.	Description of Stores	Total C&F Price for Part 1	Currency	Exchange Rate	Total Price for Part 1 (Rs.)	Total Price for Part II (Rs.)	Total Cost (Rs.)
1	2	3	4	5	6	7	8	9

### It is certified that:

- i) The Stores offered above conform in all respects with the particulars/specifications given in the Tender Documents; and
- ii) All the terms and conditions of the Tender Documents are acceptable to us.

\_\_\_\_\_  
(name of the Tenderer)

\_\_\_\_\_  
(signature of the authorized person)

**SEAL**

\_\_\_\_\_  
(name of the authorized person)



**ANNEXURE “D”**

**BID BOND**

(Bank Guarantee)

Guarantee No \_\_\_\_\_

Executed on \_\_\_\_\_

Expiry date \_\_\_\_\_

**Letter by the Guarantor (Bank) to the Employer (University)**

Name of Guarantor (Bank) with address: \_\_\_\_\_

\_\_\_\_\_

Name of Principal (Tenderer) with address: \_\_\_\_\_

\_\_\_\_\_

Penal sum of Security (Bond),(in figures and words): \_\_\_\_\_

\_\_\_\_\_

Tender Reference No. \_\_\_\_\_ Date of Tender \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Tender and at the request of the said Principal (Tenderer), we the Guarantor above-named are held and firmly bound unto the Vice Chancellor, Mehran University of Engineering and Technology, Jamshoro, acting through the Director (Works & Services), Mehran University of Engineering and Technology, {hereinafter called The “Employer” (“University”)} in the sum stated above, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal (Tenderer) has submitted the accompanying Tender numbered and dated as above for supply, installation, putting into operation and demonstration of equipment in the laboratories Mehran University of Engineering and Technology, Jamshoro, to the said Employer (University); and

WHEREAS, the Employer (University) has required as a condition for considering the said Tender that the Principal (Tenderer) furnish a Bid Bond in the above said sum to the Employer (University), conditioned as under:

- 1) that the Bid Bond shall remain valid for a period of 28 days beyond the period of validity of the Tender;

2) that in the event of;

- a) the Principal (Tenderer) withdraws his Tender during the period of validity of the Tender;
- b) the Principal (Tenderer) does not accept the correction of his Tender Price, pursuant to Clause 16 of “Instructions to Tenderers”; or
- c) failure of the successful Tenderer to:
  - i) furnish the required Contract Performance Bond, in accordance with Clause 3 of “Instructions to Tenderers”; or
  - ii) sign the proposed Contract Agreement, in accordance with Clause 4 of the “Conditions of Contract”;

then the entire sum be paid immediately to the said Employer (University) as liquidated damages and not as penalty for the successful Tenderer’s failure to perform.

NOW THEREFORE, if the successful tenderer shall, within the period specified therefore, on the prescribed form presented to him for signature enter into a formal Contract with the said Employer (University) in accordance with his Tender as accepted and furnish within twenty eight (28) days of his being required to do so, a Contract Performance Bond with good and sufficient surety, as may be required, upon the form prescribed by the said Employer (University) for the faithful performance and proper fulfillment of the said Contract or in the event of rejection of the said Tender by the Employer (University) within the time specified then this obligation shall be void and of no effect, but otherwise to remain in full force and effect.

PROVIDED THAT, the Guarantor shall forthwith pay to the Employer (University) the said sum stated above upon first written demand of the Employer (University) without cavil or argument and without requiring the Employer (University) to prove or to show grounds or reasons for such demand notice of which shall be sent by the Employer (University) by registered post duly addressed to the Guarantor at its address given above.

PROVIDED ALSO THAT, the Employer (University) shall be the sole and final judge for deciding whether the Principal (Tenderer) has duly performed his / her obligations to sign the Contract Agreement and to furnish the required Contract Performance Bond within the time stated above, or has defaulted in fulfilling the said requirements and the Guarantor shall pay without objection the sum stated above upon first written demand from the Employer (University) forthwith and without reference to the Principal (Tenderer) or any other person.

IN WITNESS WHEREOF, the above bounden Guarantor has executed the instrument under its seal on the date indicated above, the name and seal of the Guarantor being hereto affixed and these presents duly signed by its undersigned representative pursuant to the authority of its governing body.

\_\_\_\_\_  
Guarantor (Bank)

**Witness:**

1. \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Name, Title, Address and Seal)

\_\_\_\_\_  
(Name)

2. \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
(Name, Title, Address and Seal)

\_\_\_\_\_  
(Corporate Guarantor Seal)

**CONTRACT PERFORMANCE BOND**  
(Bank Guarantee)

Guarantee No. \_\_\_\_\_

Executed on \_\_\_\_\_

Expiry Date \_\_\_\_\_

**Letter by the Guarantor (Bank) to the Employer (University)**

Name of Guarantor (Bank) with Address: \_\_\_\_\_  
\_\_\_\_\_

Name of Principal (Contractor) with address: \_\_\_\_\_  
\_\_\_\_\_

Penal Sum of Security (Bond), (in words and figures) \_\_\_\_\_  
\_\_\_\_\_

Letter of Acceptance No. \_\_\_\_\_ Dated \_\_\_\_\_

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the Tender Documents and above said Letter of Acceptance (hereinafter called the Documents) and at the request of the said Principal (Contractor) we, the Guarantor above named, are held and firmly bound unto the Vice Chancellor, Mehran University of Engineering and Technology, Jamshoro, Sindh, acting through the Director (Works & Services), Mehran University of Engineering and Technology {hereinafter called the Employer (University)} in the penal sum of amount stated above for the payment of which sum well and truly to be made to the said Employer (University), we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal (Contractor) has accepted the Employer's (University's) above said Letter of Acceptance for the supply, installation, putting into operation and demonstration of Equipment of Laboratories of Mehran University of Engineering and Technology, Jamshoro, Sindh.

NOW THEREFORE, if the Principal (Contractor) shall well and truly perform and fulfill all the undertakings, covenants, terms and conditions of the said Documents during the original terms of the said Documents and any extensions thereof that may be granted by the Employer (University), with or without notice to the Guarantor, which notice is hereby waived and shall also well and truly perform and fulfill all the undertakings, covenants, terms and conditions of the Contract and of any and all modifications of the said Documents that may hereafter be made, notice of which modifications to the Guarantor being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue till the expiry of the guaranty period as per Clause 23 of the Conditions of Contract.

Our total liability under this Guarantee is limited to the sum stated above and it is a condition of any liability attaching to us under this Guarantee that the claim for payment in writing shall be received by us within the validity period of this Guarantee, failing which we shall be discharged of our liability, if any, under this Guarantee.

We, \_\_\_\_\_ (the Guarantor), waiving all objections and defenses under the Contract, do hereby irrevocably and independently guarantee to pay to the Employer (University) without delay upon the Employer's (University's) first written demand without cavil or arguments and without requiring the Employer (University) to prove or to show grounds or reasons for such demand any sum or sums up to the amount stated above, against the Employer's (University's) written declaration that the Principal (Contractor) has refused or failed to perform the obligations under the Contract which payment will be effected by the Guarantor to the Employer's (University's) designated Bank and Account Number.

PROVIDED ALSO THAT the Employer (University) shall be the sole and final judge for deciding whether the Principal (Contractor) has duly performed his obligations under the Contract or has defaulted in fulfilling the said obligations, and the Guarantor shall pay without objection any sum or sums up to the amount stated above upon first written demand from the Employer (University) forthwith and without any reference to the Principal (Contractor) or any other person.

IN WITNESS WHEREOF, the above bounden Guarantor has executed this Instrument under its seal on the date indicated above, the name and corporate seal of the Guarantor being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body

**Witness:**

1. \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
Name, Title and Address (Seal)

2. \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
Name, Title and Address (Seal)

\_\_\_\_\_  
Guarantor (Bank)

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Name)

\_\_\_\_\_  
(Title)

\_\_\_\_\_  
Corporate Guarantor (Seal)

**ANNEXURE “F”**

**Statement Describing Deviation from Specifications.**

<b>S.No.</b>	<b>Code No.</b>	<b>Description of Stores</b>	<b>Statement of Variation from Specifications</b>	<b>Reasons for Variations.</b>
1	2	3	4	5

\_\_\_\_\_  
(signature of the authorized person)

\_\_\_\_\_  
(name of the authorized person)

**SEAL**

**On behalf of**

\_\_\_\_\_  
(name and address of the Tenderer)

**BILL OF QUANTITIES FOR**  
**LAB EQUIPMENT**  
**FOR**  
**DEPARTMENT OF ELECTRONIC**  
**ENGINEERING**  
  
**ITEM CODE**

<b>ES/FBDDL, ES/AIPL, ES/ATPCL</b>
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# DEPARTMENT OF ELECTRONIC ENGINEERING

## 1. FPGA/ DSP BASED DESIGN AND DEVELOPMENT LABORATORY

Item code	Description of Items	Qty	Unit Rate	Amount Rs
ES/FBDDL-01	<p><b>FPGA based Embedded Design Device</b></p> <ul style="list-style-type: none"> <li>Affordable tool to teach and implement multiple design concepts with one device</li> <li>10 analog inputs, 6 analog outputs, 40 digital I/O lines</li> <li>Wireless, LEDs, push button, accelerometer onboard</li> <li>Xilinx FPGA and dual-core ARM Cortex-A9 processor</li> <li>Fully programmable with LabVIEW or C; adaptable for different programming levels</li> <li>Onsite Training by OEM</li> <li>Also contains USB and Ethernet Hub, Motor Adapter and motors kit</li> </ul> <p><b>Accessories included</b></p> <ul style="list-style-type: none"> <li>Driver and software evaluation DVDs</li> <li>USB cable</li> <li>Power supply with international adapters</li> <li>1 MXP protoboard accessory</li> <li>screwdriver and MSP screw-terminal connector</li> </ul> <p><b>Sensors and Actuators Kit</b></p> <ul style="list-style-type: none"> <li>Barrel connector with leads</li> <li>Assorted capacitors</li> <li>Diodes</li> <li>7-segment display</li> <li>Mechanical rotary encoder</li> <li>Photo interrupter (light sensor with LED)</li> <li>Assorted op-amps</li> <li>Assorted LEDs</li> <li>Small DC motor (1 VDC to 3 VDC, no load speed: 6600 rpm)</li> <li>Microphone with audio jack</li> <li>MXP Breadboard Accessory</li> <li>Potentiometer (500 kΩ)</li> <li>Relay</li> <li>Assorted resistors</li> <li>Piezoelectric sensor</li> <li>Photocell</li> <li>2 Hall effect sensors (latch and switch)</li> <li>Buzzer</li> <li>Assorted switches (DIP, slide, and rotary)</li> <li>Thermistor (NTC: 10 kΩ, 25 degrees)</li> <li>Assorted transistors</li> <li>Force sensing resistor</li> </ul>	5		



Item code	Description of Items	Qty	Unit Rate	Amount Rs
	<ul style="list-style-type: none"> <li>• Wire kit</li> <li>• Keypad</li> <li>• Digital temperature sensor (I2C)</li> <li>• Character LCD (I2C, SPI, and UART)</li> <li>• Digital potentiometer (SPI)</li> <li>• Bluetooth interface (UART)</li> <li>• EEPROM (SPI)</li> <li>• LED matrix</li> <li>• Geared motor 19:1 (includes encoder for rotation and speed, 12 V)</li> <li>• Ultrasonic range finder (accurate readings of 0 in. to 255 in. or 6.45 m)</li> <li>• Compass</li> <li>• Servo motor: standard (215 degrees rotation)</li> <li>• Servo motor: continuous rotation</li> <li>• Accelerometer (3 axis, digital - SPI and I2C)</li> <li>• H-bridge driver (compatible with gear motor)</li> <li>• Gyroscope (3 axis, digital - SPI and I2C)</li> <li>• Infrared proximity sensor (10 cm to 80 cm)</li> <li>• Ambient light sensor (SPI)</li> </ul>			

Item code	Description of Items	Qty	Unit Rate	Amount Rs
ES/FBDDL-02	<p><b>ST Microelectronics</b>  STM32F746G-DISCO Discovery kit with STM32F746NG MCU and accompanying TFT Module Plug in the <b>STM32F7 discovery kit allows users to develop and share applications with the STM32F7 Series microcontrollers based on ARM® Cortex®-M7 core.</b>  The discovery kit enables a wide diversity of applications taking benefit from audio, multi-sensor support, graphics, security, video and high-speed connectivity features.  The Arduino connectivity support provides unlimited expansion capabilities with a large choice of specialized add-on boards.</p> <p><b>Subject Area:</b></p> <ul style="list-style-type: none"> <li>• Embedded System Design</li> <li>• System on a chip</li> <li>• Interrupts</li> <li>• Interrupt prioritization, Nesting</li> <li>• Timers</li> <li>• Counters</li> <li>• Analog Comparators</li> <li>• Digital Input/Output</li> <li>• Serial Peripheral Interface Communication</li> <li>• Inter-Integrated Circuit Communication</li> <li>• Universal Serial Bus Communication</li> <li>• RS-232 Communication</li> <li>• IEEE-802.3-2002 Communication</li> <li>• Graphical Output devices</li> <li>• Image Processing</li> <li>• Multiply Accumulate operations</li> <li>• Floating Point Units</li> <li>• Sampling, Quantization, Aliasing</li> <li>• Convolution</li> <li>• Finite Impulse Response Filtering</li> <li>• Fourier Transforms</li> <li>• Adaptive Filters</li> <li>• Real Time Operating Systems</li> <li>• Pre-emption</li> <li>• Scheduling</li> </ul> <p>Threads, Tasks, Semaphores</p>	10		

Item code	Description of Items	Qty	Unit Rate	Amount Rs
ES/FBDDL-03	<p><b>TDS: Computer Controlled Teaching Unit for the Study of Digital Signal Processing</b></p> <p>The Teaching Unit for the Study of Digital Signal Processing “TDS” allows to study the principles and more important concepts about digital signal processing, including study and practical exercises, among others, of: Continuous waveforms generation. Analyze the nature of the signals. Working simultaneously with two external signals. Signals digitalization. Fast Fourier Transform visualization. Study of the effects of the digital signal processing. Study of the effects of the analog and digital filters. To analyze the time and frequency responses, before and after the digital signal processing Behaviour of the generated signal or the user’s voice when noise is added to the signal. Etc. Moreover, it is possible to generate different waveforms by the software and send them to the outputs of the unit. These signals can be visualized by an external oscilloscope or be listened by the speaker. The “TDS” unit is based on a modular design structure to allow the user a better understanding of the unit. This unit includes the following modules: Two Function Generators modules: Each function generator contains a waveform selector to choose one of the three different waveform shapes (sine, triangle and square) and three potentiometers to regulate the frequency, the amplitude and the duty cycle of the signal. Noise Generator module: It includes two different noise generators: white noise and pink noise. Each noise generator includes a potentiometer to regulate the amplitude of the noise signal. Microphone and Microphone Pre-Amplifier module: It allows to record and adapt the user’s voice to be analyzed with the software of the unit. PC Inputs/Outputs module: It allows to connect the unit with the data acquisition board (to be placed in the computer) and shows the acquired signals in the unit software. This module contains two BNC connectors for signal inputs and two BNC connectors for signal outputs. Power Amplifier module: It contains a potentiometer to regulate the power amplification of the signal. Speaker module: It allows to hear the generated signals of the unit and to study the effects of the noise and digital signal processing in the studied signal. All connections between modules are performed through RF coaxial cable assembly.</p>	5		

Item code	Description of Items	Qty	Unit Rate	Amount Rs
<b>ES/FBDDL-04</b>	<b>NI ELVIS II, NI ELVIS II+</b> Modular Engineering Educational Laboratory Platform <ul style="list-style-type: none"> <li>▪ Integrated suite of 12 instruments</li> <li>▪ 100 MS/s oscilloscope option (NI ELVIS II+)</li> <li>▪ Includes Basic Breadboard for Circuits and Electronics</li> <li>▪ Complete integration with NI Multisim for teaching circuits concepts</li> </ul> Extend your lab with companion products from Quanser, Freescale, Emona, and more	<b>5</b>		
<b>ES/FBDDL-05</b>	<b>EmonaSIGEx Add-on Board</b> For Teaching Signals and Systems with NI ELVIS <ul style="list-style-type: none"> <li>▪ Hands-on approach to learning signals and systems</li> <li>▪ Covers signals and systems concepts from six top textbooks</li> <li>▪ Complete integration with NI ELVIS and NI LabVIEW software</li> </ul> Includes printed lab manual of 16 experiments with software based on LabVIEW	<b>5</b>		

## 2. ADVANCED INDUSTRIAL PROCESS LABORATORY

Item Code	Description	Qty	Unit Rate	Amount Rs.
ES/AIPL-01	<p><b>SAIT : Transducers and Instrumentation Trainer</b></p> <p><b>Input Transducers:</b>  Resistance Transducers for applications in angular or linear position:  Linearly sliding potentiometer.  Rotary carbon-track potentiometer.  Rotary coil potentiometer.  Precision servo-potentiometer.  The Wheatstone Bridge circuit.  Applications of temperature:  NTC (Negative Temperature Coefficient)  Thermistors.  RTD Sensor (Platinum Transducer with Temperature dependent Resistance).  Temperature sensor IC “Integrated Circuit LM 335”.  Type “K” Thermocouples.  Applications of light:  Photovoltaic Cell. Phototransistor. Photodiode PIN.  Photoconductive Cell.  Linear position and force:  Linear Variable Differential Transformer LVDT.  Extensimetric Transducer.  Environmental measurements:  Air flow Sensor. Air pressure Sensor. Humidity sensor.  Rotational speed and position control:  Slotted optoelectronic Sensor.  Opto- reflective Sensor.  Inductive sensor.  Hall effect Sensor.  Permanent D.C. magnet tachogenerator.  Sound measurements:  Dynamical microphone.  Ultrasonic receiver.</p> <p>Visualization Devices:  Timing device/ counter with LED display.  Graphic bar visualizer.  Mobile coil voltmeter.</p> <p>Output Transducers:  Electrical Resistance.  Incandescent Lamp.  Applications for the sound output:  Buzzing (Buzzer).  Mobile coil loud speaker.  Ultrasonic transmitter.  Applications of linear or angular motion:</p>	5		

Item Code	Description	Qty	Unit Rate	Amount Rs.
	D.C. Solenoid. D.C. Relay. Solenoid Valve. Permanent Magnet D.C. Motor.  Signal Conditioners: D.C. Amplifiers. A.C. Amplifier. Power Amplifier. Current Amplifier. Buffers. Inverting Amplifier. Differential amplifier. V/F and F/V Converters. V/I and I/V Converters. Full Wave Rectifier. Hysteresis convertible Comparator. Electronic switch. Oscillator 40 kHz. Filter 40 kHz. Time-constant convertible Low Pass Filter. Circuit with Mathematical Operation: Adding amplifier. Integrator with different time constants. Differentiator with different time constants. Instrumentation Amplifier. Circuit SAMPLE & HOLD. Amplifiers with gain control and offset.  Furthermore it contains a linearly mounted system of a D.C. motor, tachodynamo, reflective, slotted opto-sensors to detect the absolute and incremental position Cables.			

Item Code	Description	Qty	Unit Rate	Amount Rs.
ES/AIPL-02	<p><b>EDAS/VIS-1.25: EDIBON Data Acquisition System / Virtual Instrumentation System, (1.250.000 samples per second)</b></p> <p>Metallic box. Dimensions: 310 x 220 x 145 mm. approx.</p> <p>Front panel:</p> <p>16 Analog inputs (1 block with 12 voltage channels and 1 block with 2 current channels (4 connections)).</p> <p>Sampling velocity 1,250,000 samples per second for EDAS/VIS 1.25 Version.</p> <p>Sampling velocity 250,000 samples per second for EDAS/VIS 0.25 Version.</p> <p>2 Analog outputs.</p> <p>24 Digital inputs/outputs, configurable as inputs or outputs, with 24 state led indicators. These digital inputs/outputs are grouped in three ports of eight channels (P0, P1 and P3).</p> <p>4 Digital signal switches 0-5V.</p> <p>2 Analog signal potentiometers <math>\square\square</math> 12V.</p> <p>Main ON/OFF switch.</p> <p>Inside: Internal power supply of 12 and 5 V. Potentiometer.</p> <p>Back panel:</p> <p>Power supply connector. SCSI connector (for connecting with the data acquisition board).</p> <p>Connecting cables.</p>	5		

Item Code	Description	Qty	Unit Rate	Amount Rs.
ES/AIPL-03	<p><b>TECNEL: Computer Controlled Teaching Unit for the Study of Power Electronics (with IGBTs). (Converters: DC/AC+AC/DC+DC/DC+AC/AC)</b></p> <p>Diagram in the front panel with similar distribution that the elements in the real unit.  Steel box.  Front panel:  Diodes module: 6 diodes.  Thyristors module: 6 thyristors.  IGBTs Module: 6 IGBTs.  Snubber net.  Sensors module:  4 Voltage sensors.  2 Current sensors.  Power supply connections for Vr, Vs, Vt, Neutral and Ground.  Practices schemes.  Back panel:  Data Acquisition Board Connector (SCSI connector).  Tachodynamo connector.  Main fuses (Vr, Vs, Vt) and LEDs.  Circuit breaker (main switch).  Single-phase driver. Three-phase driver.  IGBT driver.  TSI board.  PIC board.  SKHI61 board.  Four relays board.  2 Three-phase relays.  Commutated power supply.  Three-phase magnetothermal.  Control Interface.</p> <p><b>Loads:</b>  - <b>IND. Inductance + REV. Variable Resistance. (2 units of each one)</b>  <b>OR</b>  - <b>RCL3R. Resistive, Inductive and Capacitive Loads Module.</b></p>	5		



Item Code	Description	Qty	Unit Rate	Amount Rs.
ES/AIPL-04	<p><b>Computer Controlled Process Control System with electronic valve control study of Temperature, Pressure, Level, Flow, pH, Conductivity and TDS.</b></p> <p>Bench-top unit. This unit is common for all Sets for Process Control type “UCP” and can work with one or several sets. Anodized aluminium structure and panels in painted steel. Main metallic elements in stainless steel. Diagram in the front panel with similar distribution to the elements in the real unit. A transparent main tank and collector with an orifice in the central dividing wall (2 x 25 dm<sup>3</sup>), and drainage in both compartments. A transparent dual process tank (2 x 10 dm<sup>3</sup>), interconnected through an orifice and a ball valve and an overflow in the dividing wall; a graduate scale and a threaded drain of adjustable level with bypass. 2 Centrifugal pumps, range: 0-10 l/min. 2 Variable area flow meters (0.2-2 l/min, and 0.2-10 l/min), and with a manual valve. Line of on/off regulation valves (solenoid). Usually one is normally opened, and the other two are normally closed, and manual drainage valves of the upper tank. Proportional valve: a motorized control valve: Brass valve G ½”: Pmax. 4 bar. 24 volts. Control 12-24 V. 200-1000 mA. Temperature: -10 to 60°C. Any Set for Process Control type “UCP” will be supplied installed in the Base Unit and ready for working.</p> <p><b>Set for Temperature Process Control:</b>  <b>Set for Flow Process Control:</b>  <b>Set for Pressure Process Control:</b>  <b>Set for level Process Control</b>  <b>Set for pH Process Control</b>  <b>Set for TDS Process Control</b></p> <p>This unit allows that the 30 students of the classroom can visualize simultaneously all results and manipulation of the unit, during the process, by using a projector.</p>	1		

Item Code	Description	Qty	Unit Rate	Amount Rs.
ES/AIPL-05	<p><b>Modular System for the Study of Sensor</b></p> <p>All elements are included in a metallic box.</p> <p>Signal Conditioning Circuits:</p> <ul style="list-style-type: none"> <li>• Amplifiers:</li> </ul> <p>DC amplifiers:</p> <ul style="list-style-type: none"> <li>- 3 Amplifiers.</li> <li>- Input range: +/-12 Vdc.</li> <li>- Input Impedance: 100 K<math>\Omega</math>.</li> <li>- Adjustable gain: 1, 10,100 for the “Amplifier 1” and “Amplifier 2”.</li> <li>- Fixed gain: 100 for “x100 Amp”.</li> </ul> <p>AC Amplifier:</p> <ul style="list-style-type: none"> <li>- Input range: 12 Vac.</li> <li>- Adjustable gain: 10, 100, 1000.</li> <li>- Bandwidth: 10 - 16000Hz.</li> </ul> <p>Power Amplifier:</p> <ul style="list-style-type: none"> <li>- Input range: 12 V max.</li> <li>- Output current: 1.5 A max.</li> <li>- Output power: 9W max.</li> </ul> <p>Current Amplifier:</p> <ul style="list-style-type: none"> <li>- Gain: 10,000.</li> <li>- Output current: 1A max.</li> </ul> <p>Buffers:</p> <ul style="list-style-type: none"> <li>- 2 Buffers.</li> <li>- Input voltage: 12V max.</li> <li>- Input impedance: 100 K<math>\Omega</math>.</li> </ul> <p>Inverting Amplifier:</p> <ul style="list-style-type: none"> <li>- Input voltage: 12V max.</li> <li>- Input impedance: 100 K<math>\Omega</math>.</li> <li>- Gain: -1.</li> </ul> <p>Differential Amplifier:</p> <ul style="list-style-type: none"> <li>- Input voltage: 12V max.</li> <li>- Inputs impedance: 100 K<math>\Omega</math> (Input A) and 200 K<math>\Omega</math> (Input B).</li> <li>- Ad (Differential gain): 1.0.</li> <li>- Ac (Common mode gain): 0.02 max.</li> </ul> <p>Instrumentation Amplifier:</p> <ul style="list-style-type: none"> <li>- Input voltage: 12V max.</li> <li>- Inputs impedance: 100 K<math>\Omega</math>.</li> <li>- Ad (Differential gain): 1.0.</li> <li>- Ac (Common mode gain): 0.006 max.</li> </ul> <p>Summing Amplifier:</p> <ul style="list-style-type: none"> <li>- Input voltage: 12V max.</li> <li>- 3 Inputs.</li> <li>- Gain: 1.</li> </ul> <ul style="list-style-type: none"> <li>• Comparators:</li> </ul> <p>Schmitt trigger.</p>	1		

Item Code	Description	Qty	Unit Rate	Amount Rs.
	<p>Filters:</p> <p>40kHz filter: Pass-Band Filter at 40kHz.</p> <p>Low-pass filter: Selectable cut-off frequencies at 15Hz, 1.44Hz, 0.14Hz.</p> <ul style="list-style-type: none"> <li>• Integrator: Selectable Time constants: 100ms, 1s, 10s.</li> <li>• Differentiator: Selectable Time constants: 10ms, 100ms, 1s.</li> <li>• “Sample/Hold”: Time constant: 1ms.</li> <li>• Converters Circuits: Voltage to Current (V/I) converter: <ul style="list-style-type: none"> <li>- Output current: <math>\pm 20\text{mA}</math> max.</li> <li>- Transfer ratio: 10mA/V.</li> </ul> Current to Voltage (I/V) converter: <ul style="list-style-type: none"> <li>- Output voltage: <math>\pm 2\text{ V}</math> (6 V max.).</li> <li>- Transfer ratio: 0.1V/mA.</li> </ul> Frequency to Voltage (F/V) converter: <ul style="list-style-type: none"> <li>- Transfer ratio: 1 V/kHz.</li> <li>- Maximum input frequency: 10 kHz.</li> <li>- No linearity: 0.024%.</li> </ul> Voltage to Frequency (V/F) converter: <ul style="list-style-type: none"> <li>- Transfer ratio: 1 kHz/V.</li> <li>- Maximum input frequency: 10 kHz.</li> <li>- No linearity: 0.024%.</li> </ul> </li> <li>• Other circuits: Full-Wave Rectifier. 40kHz Oscillator: <ul style="list-style-type: none"> <li>- Output frequency: 41093 Hz.</li> <li>- Output amplitude: 5 Vpp.</li> </ul> Alarm Oscillator: <ul style="list-style-type: none"> <li>- Oscillator frequency: 700Hz.</li> <li>- Switch turn off voltage: 2.3V.</li> </ul> Electronic Switch: <ul style="list-style-type: none"> <li>- Input voltage: 12 V max.</li> <li>- Switch voltage: 2.1V.</li> <li>- Output current: 500mA max.</li> </ul> Control Circuits: <ul style="list-style-type: none"> <li>• PID: Process control applications. Independent PID parameters adjustment (Proportional, Integrative and Derivative).</li> <li>• Industrial Controller: Input: DC voltage, RTD sensor or Thermocouple. Output 1: Relay. Alarm output: Relay.</li> <li>• Relay: Double relay. NO and NC terminal. 12Vdc coil excitation.</li> </ul> </li></ul>			

Item Code	Description	Qty	Unit Rate	Amount Rs.
	<ul style="list-style-type: none"> <li>• DC Dimmer: Light dimmer or DC motor speed controller applications. PWM generator. Frequency and duty cycle adjustable. Power Elements:</li> <li>• Power Supply: AC voltage range: 0 to 30 Vac. DC voltage range: 0 to +15 Vdc. Output current: 4A max.</li> <li>• DC Source: 2 Output for each voltage. DC voltages: +5 Vdc,-5 Vdc,+12 Vdc,-12 Vdc,0 to 12 Vdc. Output current: 500mA max.</li> <li>• Wave Generator: Sine, square, triangular and sawtooth waveforms. Frequency range: 100 to 10000 Hz. Amplitude range: Adjustable +/- 10V.</li> <li>• Potentiometers: 4 Potentiometers. Impedance values: 0-1 K<math>\Omega</math>, 0-5 K<math>\Omega</math>, 0-10 K<math>\Omega</math> and 0-20 K<math>\Omega</math>. Power dissipation: 1 W max.</li> <li>Measuring Elements:</li> <li>• L.E.D. bar graph display: Input range: 0-5V.</li> <li>• Counter/Timer: Temporization applications. Counting applications.</li> <li>• Moving coil meter.</li> </ul> <p><b>Module:</b>  Vibration and Deformation Module  Temperature Test Module  Pressure Test Module  Flow Test Module  Oven Test Module  Liquid Test Module  Tachometer Test Module  Proximity Test Module  Pneumatic Test Module  Light Test Module</p>			

### 3. AUTOMATION TECHNOLOGIES & PROCESS CONTROL LABORATORY

Item Code	Description of Items	Qty	Unit Rate	Amount Rs.
ES/ATPCL-01	<p><b>SERIN/CC: Computer Controlled Advanced Industrial Servo system Trainer (for DC Motors)</b></p> <p>It is formed by a Control Interface Box and a Direct Current Motor and Encoder Module.</p> <p>The Control Interface Box has a 4-quadrants servo amplifier for DC motors that controls the motor speed, position and current of the motor. In order to do this control the feedback is done thanks to an encoder.</p> <p>The RS232 communication between the Control Interface Box and the computer (PC) provides the possibility of commanding the motor from the PC and to visualize the most important signals of the motor.</p> <p>The 4-quadrant servo amplifier controls the motor operation and the braking operation in both rotation directions clockwise and counter clockwise.</p> <p>Velocity, Position and Torque Control.</p> <p>It allows predefined moves and programming.</p> <p>Control Interface Box:</p> <p>Front panel:</p> <p>Diagram in the front panel with similar distribution that the elements in the real unit.</p> <p>7 Digital outputs:</p> <p>They have led's that indicate if the outputs are active or not.</p> <p>Output 1: this output indicates when the system has been referenced already.</p> <p>Output 2: this output indicates when a target position is reached.</p> <p>Output 3: this output indicates when the motor is running.</p> <p>Output 4: this output indicates when a command cannot be executed.</p> <p>Output 5: this output indicates when an error occurs.</p> <p>Output 6: this output is a user definable PWM-output (5V, 0-100% duty cycle, 50kHz).</p> <p>Output 7: this output is the common cathode of the freewheeling diode of the low side drivers.</p> <p>13 Digital inputs:</p> <p>7 User definable digital inputs for process control.</p> <p>1 Digital input (trigger signal).</p> <p>3 Digital inputs: reference, left limit and right limit:</p>	5		

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	<p>DI reference: digital input for reference switch.  DI left limit: digital input for left limit switch of a linear unit.  DI right limit: digital input for right limit switch of a linear unit.</p> <p>2 Digital inputs power stage and stop:  DI power stage: digital input for enabling the power stage.  DI stop: digital input for switching the regulation off if the signal is removed.</p> <p>2 Analog inputs with voltages in the range of 0-5V.  2 Potentiometers to select the value of the analog inputs (0-5 V DC), these potentiometers are enabled by a commuting switch placed next to them.</p> <p>Ignition Switch. When the unit is on, the red LED is active and lighting.</p> <p>Back panel:  Voltage supply. There is a voltage supply that feeds the unit with 220 V of alternating current.  Motor power supply. It is a 24 V DC motor power supply (it is a three wires connection motor +, motor - and one taking to earth).  Connection port in series. It is a connection plug to connect the Control Interface with the PC by the RS-232 port, in order to allow the software to manage the motor.  Connection with the Feedback. It is a connection with the motor Feedback. It allows the encoder to manage the motor.  Direct Current Motor and Encoder Module:  DC Motor, 90W. Position, speed and current are controlled by the Control Interface.  Digital encoder, 500 pulses per revolution, with RS232 communication port.  2 Power supply wires (one for the motor and other for the Control Interface).  2 Communication RS232 wires (one from the Control Interface to the computer (PC) and other from the Control Interface to the encoder).</p>			

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ES/ATPCL-02	<b>NI ELVIS II, NI ELVIS II+</b>  Modular Engineering Educational Laboratory Platform <ul style="list-style-type: none"> <li>▪ Integrated suite of 12 instruments</li> <li>▪ 100 MS/s oscilloscope option (NI ELVIS II+)</li> <li>▪ Includes Basic Breadboard for Circuits and Electronics</li> <li>▪ Complete integration with NI Multisim for teaching circuits concepts</li> </ul> Extend your lab with companion products from Quanser, Free scale, Emona, and more	5		
ES/ATPCL-03	<b>Quanser QNET VTOL 2.0 Add-On Board</b>  For Teaching Flight Dynamics and Control With NI ELVIS <ul style="list-style-type: none"> <li>▪ Illustrate the basic principles of flight dynamics with a 1 DOF helicopter</li> <li>▪ Teach flight dynamics, modeling, model validation, PID 03control, and more</li> <li>▪ Simulate models and implement controllers in one software platform</li> </ul> Save time with a comprehensive curriculum that enables deep understanding of engineering principles	3		

Item Code	Description of Items	Qty	Unit Rate	Amount Rs.
ES/ATPCL-04	<p><b>Quanser QNET Rotary Inverted Pendulum 2.0 Add-On Board</b></p> <p>For Teaching Controls With NI ELVIS</p> <ul style="list-style-type: none"> <li>▪ Illustrate pendulum control using a rotating arm with a DC servo motor and optical encoders</li> <li>▪ Build intuition by taking models from simulation to implementation using one software platform</li> </ul> <p>Save time with comprehensive curriculum that enables a deep understanding of engineering principles</p>	3		
ES/ATPCL-05	<p><b>NI My DAQ with Project Guides</b></p> <p>8 analog inputs (14-bit, 48 kS/s)  2 static analog outputs (12-bit); 12 digital I/O; 32-bit counter  Bus-powered for high mobility; built-in signal connectivity.  Contains Project Guides on Circuits, Signals &amp; Systems and hands on experiments</p> <p><b>Subject Area:</b></p> <ol style="list-style-type: none"> <li>1. Signal Conditioning</li> <li>2. Analog to Digital Conversion Process</li> <li>3. Digital to Analog Conversion Process</li> <li>4. Sensitivity, Resolution</li> <li>5. Intelligent Instrumentation</li> <li>6. Data Acquisition Systems</li> </ol> <p>Graphical User Interfaces</p>	5		