Tender No. 09 (C)/2024

UNIVERSITY OF CHAKWAL

TENDER DOCUMENT

For

PURCHASE OF LAB EQUIPMENTS FOR ELECTRONICS ENGINEERING DEPARTMENT

Issued To:_____

Project Manager (PMU)
Ph. No.: 0543-553736

Purchase Of Lab Equipment's For Electronics Engineering Department From The Project Titled "Construction Of Building At University Of Chakwal City Campus"

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Tender Notice

Sealed tenders/ bids are invited from the firms registered with Sales Tax and Income Tax Departments for following Tender on the basis of **Single Stage (Two Envelope Procedure)** in terms of Rule No. **38 2(a)** of the Punjab Procurement Rules 2014 (PPRA Rules 2014).

Tender No.	Tender Name	Budgetary Amount	QTY	Closing Time and Date	Opening Time and Date
09(C)/2024	**Purchase of Lab Equipment for Electronics Engineering Department From Project Titled "Construction of Building at University of Chakwal City Campus"**	82.635 Million	Detail in Tender Document	03-03-2025 till 11:30AM	03-03-2025 at 12:00PM

- Tender Document will be immediately available after publishing of this Tender Notice under Rule No. 25(1).
- The Tender/Bid Document can be downloaded **free of cost** from PPRA website (https://ppra.punjab.gov.pk/), University website (www.uoc.edu.pk) or www.eproc.punjab.gov.pk or E-PADS (e-Pak Acquisition & Disposal System)
- The Bid Security of Rs. **1,652,700/-** which is equal to **2%** of Budgeted Cost, in the form of "Bank Guarantee / CDR / Bank Draft / Pay Order" in favor of "Treasurer, University of Chakwal shall be provided by the bidders. A scanned copy of the Bid Security must be uploaded in PDF format without which the offer shall be rejected being non –responsive.
- Bids without supporting documents, undertaking, valid documentary evidence, and bids not conforming to terms and conditions given in the Tender Document will be liable for rejection.
- No supporting document will be accepted, at all, after opening of the Technical Bids. Bids received after due date and time or bids without Bid Security in shape of CDR, Bank Draft, Pay Order or less than required amount or Bid Security in shape of Cheque/ Cross Cheque shall be summarily rejected.
- The University reserve the right to modify/withdraw/cancel the bids/tender at any time prior to award of Contract, without assigning any reason or any obligation to inform the Tenderer of the grounds for the Purchaser's action, and without thereby incurring any liability to the Tenderer and the decision of the Purchaser shall be final.
- Bids should be submitted thorough E-PADS (e-Pak Acquisition & Disposal System), and the same should be opened online. Late bid shall not be accepted by the online system.
- For obtaining any further information or clarifications, please contact the officer named below:

Project Manager (PMU)
University of Chakwal
Ph#0543-553736

1. **Invitation To the Bid**

1.1. Bids/Tenders are invited **Purchase of Lab Equipment for Electronics Engineering Department From Project Titled "Construction of Building at University of Chakwal City Campus"** from Sales Tax and Income Tax Registered firms.

2. **Instructions to the Bidders**

2.1. Procurement will be made under Punjab Procurement Rules (PPRA), 2014.

2.2. It will be clearly understood that the Terms and Conditions mentioned in this document are intended to be strictly enforced.

2.3. Bidders must ensure that they submit all the required documents indicated in the Tender / Bidding Documents at the time of opening of Technical Bids and no request for submission of missing documents will be entertained after opening of the Technical Bids.

2.4. Bids without supporting documents, undertaking, valid documentary evidence, and bids not conforming to terms and conditions given in the Tender Document will be liable for rejection. Bids received after due date and time, and bids without Bid Security in shape of Demand Draft, Pay Order, CDR or less than required amount or Bid Security in shape of Cheque or Cross Cheque shall be rejected.

2.5. No supporting document will be accepted, at all, after opening of the Technical Bids.

2.6. The bidder must quote rates of each item in a lot/package, partial bidding in a lot is allowed.

2.7. **Mode of Advertisement**:

As per Rule 12(2) of PPRA 2014 amended up to date, the tender has been published on www.uoc.edu.pk , on the website of PPRA Punjab www.eproc.punjab.gov.pk and E-PADS (e-Pak Acquisition & Disposal System) https://punjab.eprocure.gov.pk.

2.8. **Type of Open Competitive Bidding**

As per Rule No. 38(2) a, single stage two envelope procedure shall be followed with details given below:

2.8.1. Proposals from interested bidders must be submitted through EPADS in accordance with the current prescribed policy / procedure set by PPRA 2014 (amended till date) fulfilling all codal formalities / terms &conditions as required in the bidding documents

2.8.2. The Purchaser shall evaluate the technical proposal under **PPRA Rule # 32** and in a manner prescribed in this document, without reference to the price and reject any proposal which does not conform to the specified requirements as listed in said sections. During the technical evaluation no amendments in the technical proposal shall be permitted;

2.8.3. The financial proposals of technically qualified bidders shall be opened publicly online at a time, and venue announced and communicated to the bidders through e-PADS or by other way etc

2.8.4. The proposals shall be opened through E-PADS at a time, and venue announced and mentioned in below BID DATA SHEET.

2.8.5. Work order will be issued to bidders as per the availability of funds.

2.9. Bid Data Sheet (Information for the Bidders)

1	Procuring Agency	University of Chakwal
2	Tender Number	09(C)/2024
3	Name of Tender	Purchase of Lab Equipment for Electronics Engineering Department From Project Titled "Construction of Building at University of Chakwal City Campus"
4	Tender Document available place	The Tender/Bid Document can be downloaded free of cost from PPRA website (https://ppra.punjab.gov.pk/), University website (www.uoc.edu.pk) or www.eproc.punjab.gov.pk or E-PADS (e-Pak Acquisition & Disposal System
5	Cost of Tender Document	Can be downloaded free of cost from https://ppra.punjab.gov.pk/ or www.uoc.edu.pk or www.eproc.punjab.gov.pk
6	Bid Security	Amount mentioned in Clause No. 9 of the Tender Document in shape of Bank Guarantee, CDR, Pay Order, Bank Draft etc., in favor of "Treasurer, University of Chakwal, Chakwal"
7	Performance Guarantee	10% of Contract Value after issuance of Letter of Acceptance
8	Tender Addressed to	Convener, Purchase Committee, University of Chakwal.
9	Contact Number	Ph. 0543-553736
10	Due date and time for submission of Tender Document (Via E-Pads)	03-03-2025 **till 11:30 AM** Through E-PADS (e-Pak Acquisition & Disposal System) https://punjab.eprocure.gov.pk.
11	Date, time and place of Technical Bid Opening (Via E-Pads)	**03-03-205 till 12:00 PM** at **Seminar Hall**, Ground Floor, Engineering Building, University of Chakwal (Main Campus), Main Talagang Road, Chakwal. Through E-PADS (e-Pak Acquisition & Disposal System) https://punjab.eprocure.gov.pk.
12	Date, time and place of Financial Bid Opening (Via E-Pads)	Shall be intimated subsequently to Technically Qualified firms through e-PADS or by other way etc

Terms and Conditions of the Tender

3. Definitions

3.1. "Purchaser" means the procuring agency i.e. University of Chakwal.

3.2. "UOC" means University of Chakwal.

3.3. "Bidder/Tenderer" means the Firm/Company/Supplier/Distributer that may provide or provides the Goods and related services to any of the public sector organization under the contract and have registered for the relevant business thereof.

3.4. "Contract" means the agreement entered into between the Purchaser and the Contractor, in form of Supply Order or as recorded in the Contract Form signed by the parties, including all Schedules and Attachments thereto and all documents incorporated by reference therein.

3.5. "Contractor/The Successful Bidder" means the person whose Tender has been accepted and awarded letter of Acceptance followed by the Supply Order or Contract by the Purchaser.

3.6. "Contract Value" means that portion of the Contract Price adjusted to give effect to such additions or deductions as are provided for in the Contract which is properly apportion-able to the Goods or Services in question.

3.7. "Goods" means equipment, IT equipment, machinery, and/or other materials which the Contractor is required to supply to the Purchaser under the Contract.

3.8. "Services" means installation, configuration, deployment, commissioning, testing, training, support, after sale service, etc. of Goods and other such obligations which the Contractor is required to provide to the Purchaser under the Contract.

3.9. "PPRA" means Punjab Procurement Regulatory Authority.

3.10. The quantity of items to be procure can increased /decreased depending upon the availability of budget.

4. Tender Eligibility

Eligible Bidder/Tenderer is one who:

4.1. has valid registration certificates for Income Tax and Sales Tax;

4.2. is an active Income Tax Payer;

4.3. has got the experience in supply of relevant items;

4.4. has professional tax certificate for fiscal year 2024-25.

4.5. conforms to the clause of "Responsiveness of Bid" given in this tender document;

5. Examination of the Tender Document

The bidder/Tenderer is expected to examine the Tender Document, including all terms and conditions.

6. Amendment of the Tender Document

6.1. The Purchase Committee of University of Chakwal at any stage prior to the deadline for submission of the Tender, at its own initiative or in response to a clarification requested by the Bidder(s), amend the Tender Document, on any account, for any reason. All

amendment(s) shall be part of the Tender Document and binding on the Bidder(s).

6.2. The Purchaser shall notify the amendment(s) in writing to the prospective Tenderers/Bidders.

6.3. The Purchaser may, at its exclusive discretion, amend the Tender Document to extend the deadline for the submission of the Tender, in which case all rights and obligations of the Purchaser and the Tenderers previously subject to the deadline shall thereafter be subject to the deadline as extended.

7. <u>Bid Currency</u>

Bidder should quote price in **Pak Rupees only** and payments shall also be made in Pakistan Rupees only.

8. <u>Validity Period of the Bid</u>

8.1. Validity period of the bids shall be **180 days** after the opening of Financial Proposals.

8.2. In exceptional circumstances, the Purchase Committee of University of Chakwal may ask the Bidders for an extension of the period of validity. The request and the responses shall be made in writing. A bidder accepting the request will not be required nor permitted to modify its tender.

9. <u>Bid Security</u>

9.1. Bidder will submit Bid Security drawn in the name of **Treasurer, University of Chakwal** detail given below:

Item Name	Budgetary Amount	Amount of Bid Security
Purchase of Lab Equipments for Electronics Engineering Department From Project Titled "Construction of Building at University of Chakwal City Campus"	Rs.82.635 Million	Rs.1,652,700/-

9.2. Cheque or Cross Cheque shall not be accepted at all.

9.3. The amount submitted as Bid Security shall be refunded to the unsuccessful bidders after the decision for the award of the said tender.

9.4. The Bid Security of Successful Bidder(s) may be converted as part of the Performance Guarantee for successful execution of the work.

9.5. Subject to the award of contract, the Bid Security in form of CDR, Demand Draft, Pay Order shall be returned to successful bidder against submission of Performance Guarantee

9.6. If the Bid Security is found less than the required amount then the bid will be rejected irrespective of the rates and the stage of the bid process.

9.7. The Bid Security may be forfeited if a Bidder:
   a) Refuses to accept Letter of Acceptance of the Bid; or
   b) Fails to furnish Performance Security.

10. <u>Bid Preparation and Submission</u>

An e-bid or proposal shall be submitted on the e-PADS in the manner or method as specified in the advertisement before, closing date for submission, such e-bid or proposal.

The bidder shall be allowed to alter or modify his e-bid or proposal before the
closing date 'for submission of the e-bid or proposal.
The bidder shall complete and authenticate his e-bid or, proposal and submit It
within time.
In case e-bid or proposal including entries and record submitted on the e-PADS
found corrupt, un-readable or contains virus the e-bid or proposal shall be rejected.
The bidder shall submit hard copy of the financial Instrument in addition to the
soft copy uploaded on the e PADS as bid security in pdf format. The bid security shall
only be released' upon the' hard copy.

10.1. The Tender shall be filed in / accompanied by the prescribed Forms, Annexes, Schedules, Drawings, Documents, Brochures, Literature, etc. which shall be completely filled in, stamped and signed by the Tenderer or his Authorized Representative. In case of copies, photocopies may be attested.

10.2. The Bids/Tenders should be submitted in two parts (1) Technical Proposal and (2) Financial Proposal. The Technical Proposal and Financial Proposal shall be submitted through e-PADS

11. <u>Technical Proposal</u>

11.1. The Technical Proposal will enable the Purchase/Technical Committee to evaluate whether the bidder is technically competent and capable of executing the order and the specifications offered by the bidder meet the ones given in the Tender/Bid Documents. Only those bids which qualify in the technical stage will be eligible for the Financial Proposal opening. The Financial Proposals of bidders who failed in the technical stage will not be opened through automated system of e-PADS The Technical Proposal form as given in the Bid/Tender Document shall be filled, signed and stamped in all pages. The Purchase Committee will not be responsible for the errors committed in the bids by the bidders.

11.2. The Technical Proposal should not strictly contain any Price/Cost indications as such otherwise the bids will be summarily rejected.

11.3. The Bidder should quote only one brand/model/make of each item.

11.4. <u>**Detail and Order of Documents to be furnished with the Technical proposal**</u>
The documents attached with the Technical Bid must be signed and stamped by the Authorized Representative of the Bidder. The documents attached must be numbered and attached in the following order:

11.4.1. Covering letter *(Annexure-A)* duly signed and stamped by authorized representative along with copy of Bid Security.

11.4.2. Copy of Income Tax Registration Certificate *(Annexure-B)*.

11.4.3. Copy of Sales Tax Registration Certificate *(Annexure-C)*.

11.4.4. Copy of Professional Tax *(Annexure-D)*

11.4.5. Detailed specification of items *(Annexure-E)*.

11.4.6. At least three relevant Supply Orders/Contracts amounting to Rs.10 million of same nature received in the last five years *(Annexure-F)*.

11.4.7. Affidavit/Undertaking on Stamp Paper *(Annexure-G)*.

12. <u>Financial Proposal</u>

12.1. The Financial Proposal of the bidder shall also include the price break up of taxes/duties. All taxes/duties as applicable shall be responsibility of the bidders.

12.2. The cost quoted by the bidder shall be kept firm and unchanged for a period specified in the Bid/Tender Documents from the date of opening of the bids. The bidder shall keep the price firm/unchanged during the period of Contract including during the period of extension of time if any.

12.3. The quoted price will be inclusive of all taxes, duties, levies, insurance, freight (transportation charges), etc.

12.4. The Bid is liable for rejection if Financial Proposal contains conditional offer.

12.5. **Details to be furnished with Financial proposal**

    12.5.1. Financial Proposal Covering Letter **(Annexure G)**.

    12.5.2. Financial Proposal Form duly filled, signed and stamped by the Bidder **(Annexure H).**

    12.5.3. Bid Security of **Rs. 1,652,700/-**

12.6. **Mode of Submission of Bids**

The Technical Proposal and Financial Proposal in each respect as per PRRA 2014 amended up to date shall be completed in step wise as per requirement of the e-PADS system and the procuring agency will not be responsible for the mistake of the bidders if any. The Bids must be submitted through the mode of E-PADS (e-Pak Acquisition & Disposal System) https://punjab.eprocure.gov.pk

13. **Modification/Withdrawal of the Tender**

13.1. The Bidder may, by written notice served on the Purchaser, modify or withdraw the Tender after submission of the Tender, prior to the deadline for submission of the Tender.

13.2. The Tender, withdrawn after the deadline for submission of the Tender and prior to the expiration of the period of the Tender validity, shall result in forfeiture of the Bid Security.

14. **Bid Opening**

14.1. **Technical Proposal Opening**
The Technical Proposals will be opened by the Purchase/Evaluation Committee of University of Chakwal on the date and time as specified in the Tender Notice /Bid Data Sheet through online system of e-PADS. The bids will be opened in the presence of the bidders who choose to be present. A maximum of two representatives for each bidder would be allowed to attend the Bid Opening.

14.2. **Suppression of facts and misleading information**

    14.2.1. During the bid evaluation, if any suppression or misrepresentation of information is brought to the notice of the Purchase Committee, the Committee shall have the right to reject the Bid and if it happens so after selection of the Bidder, the Purchase Committee may terminate the Contract or award of the Contract or further processing of the Bid as the case may be and that will be without any compensation to the Bidder and the Bid Security/Performance Guarantee, as the case may be, shall be forfeited.

    14.2.2. It is the Bidder's responsibility to prove the Bidder's requisite qualification, experience and capacity to undertake the project to the entire satisfaction of the Purchase Committee failing which the Bid may be rejected.

15. **Preliminary Examination**

15.1. The Procuring Agency shall examine the bids to determine whether they are complete, whether any computational errors have been made, whether the required documents have been furnished and properly signed, and whether the bids are generally in order.

15.2. In the financial bids (at the time of opening the financial proposal) the arithmetical errors shall be rectified on the following basis. 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. If the Bidders/Suppliers do not accept the correction of the errors, its bid shall be rejected. If there is a discrepancy between words and figures, the amount in words shall prevail

Determination of Responsiveness of the Bid

15.3. The Purchaser shall determine the substantial responsiveness of the Tender to the Tender Document, prior to the Tender evaluation, on the basis of the contents of the Tender itself without recourse to extrinsic evidence. A substantially responsive Bid is one which:

15.3.1. meets eligibility criteria for the Bidder / the Goods / the Services;

15.3.2. meets all the mandatory requirements of the evaluation criteria;

15.3.3. meets the Technical Specifications for the Goods / the Services;

15.3.4. meets the delivery period / point for the Goods / the Services;

15.3.5. is accompanied by the required Bid Security;

15.3.6. is otherwise complete and generally in order;

15.3.7. Conforms to all terms and conditions of the Tender Document, without material deviation or reservation;

15.3.8. which offers one Brand/Model/Make for each item (which does not contain any option);

15.4. A material deviation or reservation is one which affects the scope, quality or performance of the Goods or limits the Purchaser's rights or the Bidder's obligations under the Contract.

15.5. The Tender determined as not substantially responsive shall not subsequently be made responsive by the Tenderer by correction or withdrawal of the material deviation or reservation. However, the Purchaser may waive off any minor non-conformity or inconsistency or informality or irregularity in the Tender.

16. **Technical Evaluation Criteria**

The Bidders who have duly complied with the Eligibility/Qualification and Evaluation will be eligible for further processing. The Bids which do not conform to the Technical Specifications or Bid conditions or the Bids from the Bidders without adequate capabilities for supply and maintenance / warranty services will be rejected. Under PPRA Rules # 31, Technical Bids will be evaluated on the basis of following criteria and The Eligible/Technically Qualified Bidders will be considered for further evaluation.

Financial Bids of only those bidders will be opened who have fulfilled the following criteria:

Evaluation Criteria	Requirement
Sales Tax Registration	**Mandatory**
Income Tax Registration	**Mandatory**
Professional Tax Registration FY (2024-25)	**Mandatory**
Authorization certificate from sole manufacturer	**Mandatory**

Purchase Of Lab Equipment's For Electronics Engineering Department From The Project Titled "Construction Of Building At University Of Chakwal City Campus"

S. No.	Item Name and Description	Marks	Maximum Marks
	Conformance to the required specification of items given in Schedule of Requirement		**Mandatory**
	At least three relevant (Electronics Equipment) Supply Orders/Contracts (amount Rs.20 million) of same nature received in the last five years		**Mandatory**
	Affidavit /Bidder's Undertaking on stamp paper		**Mandatory**
1	**Past Performance/ Experience of the Bidder (Reg. with GST/NTN)**	--	**10**
1.1	1 - 3 year experience	2	--
1.2	4 - 8 year experience	4	--
1.3	9 - 15 year experience	6	--
1.4	Above 15	10	--
2	**Relevant Experience (Purchase orders, supply orders, completion certificates must be attached, otherwise no marks shall be awarded.**	--	**20**
2.1	1 - 5 year experience	5	--
2.2	6 - 10 year experience	10	--
2.3	11 & above year experience	20	--
3	**Letter of Satisfaction** after sale service by the client who has purchased minimum 10 million worth equipment **Please attach satisfaction /appreciation letter. (In case of missing information, no marks may be awarded** 02 marks for each satisfaction certificate	10	**10**
4	**Financial Position/ Status**	--	**10**
4.1	Last sales tax paid Form	4	--
4.2	Bank Certificate (satisfactory)	2	--
4.3	Statement Worth (Min 20 M)	4	--
5	**Technical Evaluation of quoted items**	--	**50**
5.1	Specifications as per schedule of requirements	40	
5.2	Delivery schedule as per need	2.5	
5.3	List of clients / where such items delivered	2.5	
5.3	Guarantee / Warranty (as the case may be)	05	
	TOTAL	--	**100**

Note: - Bidders complying with all mandatory requirements and obtaining **70% marks** shall be declared as technically qualified. Financial bid of only technically qualified bidders shall be considered.

The bidder must provide Verifiable documentary proof against all the mandatory requirement along with the Technical Proposal and no document will be received or considered after opening of the Technical Proposal.

Conformance to the required specification of items given in Schedule of Requirement will be evaluated by the Technical Evaluation Committee.

The Purchase Committee and Technical Evaluation Committee may ask for physical Demonstration of any item given in the Tender Document for confirmation of specifications.

17. <u>Financial Proposal Evaluation</u>

17.1. The financial bids of technically qualified/successful bidder(s)/Tenderer(s) will be opened through E-Pads.

17.2. Financial Proposal evaluation will be conducted under the Punjab Procurement Rules, 2014. The Price evaluation will include all duties, taxes and expenses etc. In case of any exemption of duties and taxes made by the Government in favor of the Purchaser, the contractor shall be bound to adjust the same in the Financial Proposal.

18. <u>Rejection and Acceptance of the Tender/Bid</u>

18.1. The Purchaser shall have the right, at his exclusive discretion, to increase / decrease the quantity of any or all item(s), under PPRA Rules 2014 without any change in unit prices or other terms and conditions, accept a Tender, reject any or all tender(s), cancel / annul the Tendering process at any time prior to award of Contract, without assigning any reason or any obligation to inform the Tenderer of the grounds for the Purchaser's action, and without thereby incurring any liability to the Tenderer and the decision of the Purchaser shall be final.

18.2. **The Tender / bid shall be rejected if:**

18.2.1. It is substantially non-responsive; or

18.2.2. The bidder does not meet any of the mandatory criteria mentioned in Clause No. 15; or

18.2.3. It does not contain the documentary proof against any of the mandatory criteria mentioned in Clause No. 15; or

18.2.4. **The bid is incomplete, conditional, alternative, late; or**

18.2.5. the bidder does not attach Bid Security in Shape of Demand Draft, Pay Order, CDR; or

18.2.6. the bid security is not attached or it is less than the required amount; or

18.2.7. the Bidder submits more than one Bids against one Tender; or

18.2.8. the Bidder tries to influence the Purchase Committee / Contract award; or

18.2.9. the Bidder engages in corrupt or fraudulent practices in competing for the Contract award; or

18.2.10. there is any discrepancy between bidding documents and bidder's proposal i.e. any non-conformity or inconsistency or informality or irregularity in the submitted bid; or

18.2.11. the Bidder submits any financial conditions as part of its bid which are not in conformity with tender document.

19. <u>Contacting the Procuring Agency</u>

19.1. No Bidder shall contact the Purchase Committee of UOC on any matter relating to its bid, from the time of the bid opening to the time the Contract is awarded.

19.2. Any effort by a Bidder to influence the Procuring Agency in its decisions on bid evaluation, bid comparison, or Contract Award will disqualify the bidder and rejection of the bid. Canvassing by any Bidder at any stage of the Tender evaluation is strictly prohibited.

20. <u>Announcement of Evaluation Report</u>

20.1 The Procuring Agency shall announce the results of bid evaluation in the form of a report giving justification for acceptance or rejection of bids at least ten days' prior to the award of Contract. The report shall be made available on PPRA website and EPADS (e-Pak Acquisition & Disposal System) and all the bidders shall be informed of this..

21. <u>Award of Contract</u>

21.1. The Tender will be awarded to the Lowest Evaluated Bidder(s) item wise who have been declared Technically Qualified.

22. <u>Letter Of Acceptance (LOA)</u>

After acceptance of the Bids by the CPC, Letter of Acceptance (LOA) will be issued only to the Successful Bidder(s).

23. <u>Payment of Performance Guarantee (PG)</u>

23.1. The Successful Bidder(s) will be required to remit the Performance Guarantee equivalent to 10% of the value of the contract price. The PG should be paid by way of Cash Deposit Receipt (CDR), Pay Order, Demand Draft issued from scheduled bank of Pakistan in favor of "Treasurer University of Chakwal, Chakwal" as unconditional Guarantee.

23.2. The Performance Guarantee will be forfeited if the Successful Bidder withdraws the Bid during the period of Bid validity specified in the Bid Documents or if the Bidder(s) fails to sign the contract.

24. <u>Refund of Bid Security (BS)</u>

The Bid Security (BS) of the Successful Bidder may be adjusted towards Performance Guarantee payable by the firm. If the successful Bidder(s) submits Performance Guarantee for the stipulated value in full by way of Cash Deposit Receipt (CDR), Bank Draft or Pay Order the BS will be refunded. The BS of the unsuccessful Bidder will be refunded on the written request of the Bidder. The Bid Security of the successful bidder shall be released upon his request provided the bidder submits the Performance Guarantee in the shape of Cash Deposit Receipt (CDR), Bank Draft or Pay Order.

25. <u>Issuance of Supply Order or Signing the Contract</u>

25.1. The Purchase Committee shall issue Supply Order or sign a Contract with the Successful bidder who has submitted the Performance Guarantee.

25.2. The Successful Bidder will provide the **stamp paper of 0.25% of total order value** for issuance of Supply Order or Signing the Contract.

26. <u>Redressal of grievances by the procuring agency</u>

26.1. Any bidder feeling aggrieved by any act of the procuring agency after the submission of his bid may lodge a written complaint concerning his grievances not later than 10 days after the announcement of the bid evaluation report.

26.2. The committee shall investigate and decide upon the complaint within fifteen days of the receipt of the complaint.

26.3. Mere fact of lodging of a complaint shall not warrant suspension of the procurement process.

26.4. Any bidder not satisfied with the decision of the committee of the procuring agency may lodge an appeal in the relevant court of jurisdiction.

<u>General Conditions of Contract / Supply Order</u>

27. <u>Delivery of Items</u>

27.1. The Supplier will be responsible for **delivery of Items** of Purchase of Lab Equipment and in case of items which requires installation, the Bidder will be responsible for installation of items at UOC, Main Campus, Talagang Road, and Chakwal.

27.2. Delivery Period will be **Seventy Five (75) days** counted *after issuance of Purchase Order.*

27.3. After delivery of items, the Bidder must get the items inspected at UOC, Main Campus, Talagang Road, and Chakwal.

27.4. The supplier will bear all costs associated with the preparation, delivery and installation of the Items and the Purchaser will in no case be responsible or liable for those costs. The supplier will make such arrangements to ensure safe delivery of goods. Any damage sustained during transportation / delivery will be rectified by the supplier at his cost.

28. <u>Liquidated Damages</u>

28.1. When the supplier fails to deliver or install the goods or both within the time period specified in the contract, the Purchase Committee may, without prejudice to any other remedy it may have under the contract, deduct from the contract price, as liquidated damages, a sum equivalent to **0.25% of the price of the delayed goods per day of delay,** maximum up to 10% of the price of total value of the contract.

28.2. The Successful Bidder will be responsible to provide the delivery, Delivery Challan and Bill within the delivery period in order to avoid Late Delivery Charges.

29. Inspection and Tests

29.1. The Inspection Committee of UOC shall inspect and test the Goods supplied, the Services provided, under the Contract/Supply Order, to verify their conformity to the Technical Specifications.

29.2. Inspection will be done at University of Chakwal.

29.3. Inspection Committee may verify the authenticity of items.

29.4. After the inspection or test if the Inspection Committee is of the opinion that items do not conform to the specification and the criteria mentioned above, the Inspection Committee may reject them, and the supplier shall either replace the rejected goods or make all alterations necessary to meet the requirements of the specifications free of cost to University of Chakwal.

30. Release of Performance Guarantee (PG)

The Performance Guarantee will be refunded to the Successful Bidder(s) *after one year of completion of delivery and installation of Goods (Inspection).*

31. Contract Amendment

31.1. The Purchaser may, at any time, by written notice served on the Contractor, alter, amend, omit, increase, decrease or otherwise change the nature, quality, quantity and scope, of all / any of the Goods / the Services / the Works, in whole or in part.

31.2. No variation in or modification in the Contract shall be made, except by written amendment signed by both the Purchaser and the Contractor.

32. Termination for Default

The Purchase Committee of UOC may, without prejudice to any other remedy for breach of Contract, by written notice of default sent to the tenderer, terminate this Contract in whole or in part if:

32.1. the bidder fails to provide services within the period(s) specified in the Contract, or within any extension thereof granted by the Procuring entity.

32.2. the successful bidder fails to deliver goods and services as per its technical specifications offered in the bid

32.3. the successful bidder fails to perform any other obligation(s) under the Contract.

32.4. the bidder, in the judgment of the Purchase Committee has engaged in corrupt or fraudulent practices in competing for or in executing the Contract.

33. Blacklisting

If the Contractor fails / delays in performance of any of the obligations, under the Contract / Letter of Acceptance, violates any of the provisions of the Contract / Letter of Acceptance, commits breach of any of the terms and conditions of the Contract / Letter of Acceptance or found to have engaged in corrupt or fraudulent practices in competing for the award of contract / Letter of Acceptance or during the execution of the contract / Letter of Acceptance, the Purchaser may without prejudice to any other right of action / remedy it may have, blacklist the Contractor, either indefinitely or for a stated period, for future tenders in public sector, as per mechanism provided in Punjab Procurement Rules, 2014.

34. <u>Force Majeure</u>

Majeure means an act of nature or an event beyond the control of the Supplier and not involving the Supplier's fault or negligence directly or indirectly purporting to mis-planning, mismanagement and /or lack of ore sight to handle the situation. Such events may include but are not restricted to acts of the Procuring Agency in its sovereign capacity, wars or evolutions, fires, floods, earthquakes, strikes, epidemics, quarantine restrictions and freight embargoes. If a Force Majeure situation arises, the Suppliers hall promptly notify the Procuring Agency in writing with sufficient and valid evidence of such condition and the cause there of the Committee constituted for Redressal of grievances, shall examine the pros and cons of the case and all reasonable alternative means for completion of purchase order under the Contract and shall submit its recommendations to the competent authority. However, unless otherwise directed by the Procuring Agency in writing, the Supplier shall continue toper form its obligations under the Contract as far as is reasonably practical and shall seek reasonable alternative means for performance not prevented by the Force Majeure event.

35. <u>Termination for Insolvency</u>

The Procuring Agency may at any time terminate the Contract by giving written notice of 30days' time to the Supplier if the Supplier becomes bankrupt or otherwise insolvent. In this event, termination shall be without compensation to the Supplier, provided that such termination shall not prejudice or affect any right of action or remedy which has accrued or shall accrue thereafter to the Parties.

36. <u>Forfeiture of Performance Security</u>

36.1. If the Contractor fails / delays in performance of any of the obligations, under the Contract / violates any of the provisions of the Contract / commits breach of any of the terms and conditions of the Contract / Letter of Acceptance, the Purchaser may, without prejudice to any other right of action / remedy it may have, forfeit Performance Security of the Contractor.

36.2. Failure to supply required items/services within the specified time period will invoke penalty as specified in this document.

37. <u>Payment</u>

37.1. 100% payment will be made after withholding applicable taxes by UOC to the Successful Bidder after delivery and installation of goods and on receipt of the following documents:

      i.   Triplicate Original Delivery Challan.

      ii.   Triplicate Original Bill/Invoice.

      iii.   Triplicate General Sales Tax Invoice

      iv.   Inspection/Completion report

38. **Warranty**

38.1. Warranty of Equipment, Apparatus and instrument shall be one year.

38.2. The Supplier shall confirm that the goods supplied under this contract are new and unused. The Supplier shall further warrant that all goods supplied under this contract shall have no defect arising from design materials or workmanship or from any act or omission of the supplier that may arise under the normal use of the supplied goods in the conditions prevailing in the University.

38.3. The Purchase Committee shall notify the supplier in writing of any claim arising under the warranty. Upon receipt of such notice, the supplier shall repair or replace the defective goods or parts within **15days**, inclusive of, where applicable, the cost of inland delivery of the repaired or replaced goods or parts from the port of entry to the final destination and their installation.

39. <u>Specification and Schedule of Requirement</u>

Purchase of Lab Equipments for Electronics Engineering Department From Project Titled
"Construction of Building at University of Chakwal City Campus"

<u>Basic Electronics and Computer Lab</u>

Sr.No#	Name of Item	Specification	Quantity	Quoted Model
1	Basic Electricity and Electronics Trainer	Basic Electricity and Electronics Trainer Modular Electricity and Electronics Trainer with breadboard, metal casing and covering lid with Modules/Equipment be capable of performing the following experiments/features or more: DC Fixed Symmetric Power Supply 1: (-12V) - 0 - (+12V) DC DC Fixed Symmetric Power Supply 2: (-5V) - 0 - (+5V) DC DC Variable Power Supply: 0 - 36V / 0 - 1A AC Fixed Power Supply: 12V - 0 - 12V AC Function Generator: Sine, Triangle, Square (TTL) Amplitude Range: 0 - 10Vpp, Frequency Range: 10Hz - 100KHz Fixed Oscillator: 1Hz - 10Hz - 100Hz - 1KHz - 10KHz - 100KHz TTL TTL Pulse Generator: Negative and Positive TTL Pulse Generator: Negative and Positive, One shoot TTL Pulse Generator: Set - Reset – Preset Binary Switch and Indicator, 12 Bit, TTL 2x7 Segment Display / Decoder 8 Bit Logic LED Indicator 12V DC Double-contact Relay Potentiometer (1K - 10K - 100K) ON / ON Toggle Switch ON / OFF / ON Toggle Switch Buzzer 8 2W Speaker 12V Fleming Lamp APPLICATION MODULES OF ANALOG ELECTRONICS Application Modules should cover the experiment related to: • Examination of Resistance, Inductance, Capacitance in AC Examination of RL, RC, RLC serial circuits in AC • Examination of RL, RC, RLC parallel circuits in AC • Examination of parallel resonance • Examination of serial resonance • Examination of low - pass PI type filter • Examination of high - pass PI type filter • Examination of Transformer • Examination of the relation of magnet poles • Examination of magnetic field of magnet • Examination of barricading • Examination of electromagnet • Resistance color codes and measurement • Examination of OHM Law • Examination of Kirchhoff's Voltage Law • Examination of Kirchhoff's Current Law • Examination of serial, parallel and assorted connected resistance • Examination of serial, parallel and assorted connected inductances • Examination of serial, parallel and assorted connected capacitors • Experiment of Superposition Theorem • Experiment of Thevenin Theorem • Experiment of Norton Theorem • Examination of diode • The characteristic curves of diode • Examination of half-wave rectifier • Examination of full-wave rectifier • Examination of bridge type full-wave rectifier • Examination of capacitor filter • The effect of current to the fitler • Examination of ¶ type filter • Examination of voltage multiplexer - duplex • Examination of voltage multiplexer - triplet • Examination of voltage multiplexer – quartet • Transistor output characteristics in first region • Transistor output characteristics in second region • Transistor output characteristics in third region • Transistor output characteristics in fourth region • Examination of Zener diode • Examination of regular circuits with Zener diode, • Examination of parallel regular rectifier • Examination of serial regular rectifier • Examination of ideal serial	6	

| | | regular rectifier • Examination of the common emitter amplifier • Examination of common base amplifier • Examination of common collector amplifier • Examination of A class amplifier • Examination of B class amplifier • Examination of C class amplifier • Examination of audio amplifier with transistor • Examination of Integrated audio amplifier • Examination of J-FET input characteristics • Examination of J-FET output characteristics • Examination of Source grounded connection • Examination of E-MOSFET input characteristics • Examination of E-MOSFET output characteristics • Examination of E-MOSFET operation • Examination of RC phase-shift oscillator • Examination of LC oscillator • Examination of Hartley oscillator Examination of Colpitts oscillator • Examination of Crystal oscillator • Examination of Wien Bridge oscillator

APPLICATION MODULES OF DIGITAL ELECTRONICS Application Modules should cover the experiment related to: • Obtaining the truth table of AND Gate • Obtaining the truth table of 3 - Input AND Gate • Obtaining the truth table of NAND Gate • Using NAND Gate as an INVERTER • Generating 3 - Input NAND Gate using 2- Input NAND Gates • Obtaining the truth table of INVERTER Gate • Converting AND Gate into OR Gate by using INVERTER • Converting OR Gate into AND Gate by using INVERTER • Obtaining the truth table of OR Gate • Obtaining the truth table of 3 - Input OR Gate • Obtaining the truth table of NOR Gate • Using NOR Gate as an INVERTER • Obtaining 3 - Input NOR Gate using 2 - Input NOR Gates • Obtaining the truth table of EXCLUSIVE-OR Gate • Obtaining the truth table of EXCLUSIVE-NOR Gate • Examination of EXCLUSIVE-NOR Gate • Examination of COMMUTATIVE Law (OR GATE) • Examination of COMMUTATIVE Law (AND GATE) • Examination of ASSOCIATIVE Law (OR GATE) • Examination of ASSOCIATIVE Law (AND GATE) • Examination of DISTRIBUTIVE Law • Examination of IDEMPOTENCY Law • Examination of AND GATE Law • Examination of OR GATE Law • Examination of COMPLEMENT Law • Examination of INVOLUTION Law • Examination of ABSORPTION Law • Examination of DE MORGAN'S Law • R-S FLIP FLOP with NOR Gates • R-S FLIP FLOP with NAND Gates • R-S FLIP FLOP with clock • Obtaining the truth table of J-K FLIP FLOP • Obtaining the truth table of D FLIP FLOP • Obtaining the D FLIP FLOP using J-K FLIP FLOP • Obtaining the truth table of T FLIP FLOP • BINARY COUNTER application • Using BINARY COUNTER as BCD COUNTER • Examination of 7 bit BINARY COUNTER • Examination of Asynchronous up-counters composed of JK FLIP FLOP • Examination of Asynchronous down-counters composed of JK FLIP FLOP • Determining counting limits of Asynchronous counters • Examination of HALF ADDER • Examination of FULL ADDER • Examination of HALF-SUBTRACTORS • Examination of FULL-SUBTRACTORS • Shift registers composed of FLIP FLOP • Serial - Parallel SHIFT REGISTERS Experiment • Right SHIFT REGISTERS Experiment • Left SHIFT REGISTERS Experiment • Parallel input - Parallel output SHIFT REGISTERS Experiment • Examination of 6116 RAM Integrated circuit • Examination of addressing 2816 EEPROM Integrated circuit | | |

		Sliding letters experiment by using character generators and dot matrix • Examination of character generators and dot matrix • Examination of 8x1 MULTIPLEXER • Examination of 1x8 DE-MULTIPLEXER (DEMUX) • DATA Transfer MUX-DEMUX combination experiment • Analog - Digital Converters experiment ADC • Digital - Analog Converters Experiment DAC • Examination of DATA Transmission with A/D - D/A Convertors • Examination of 555 Integrated circuit as ASTABLE multivibration • Examination of 555 Integrated circuit as MONOSTABLE multivibrator • Examination of 555 Integrated circuit as BISTABLE multivibrator **OEM/Country of Origin:** USA, Europe, Japan, Turkey, Korea		
2	**Instrumentation Trainer**	Instrumentation Trainer with Modules Equipment be capable of performing the following experiments/features or more • Gas pressure measurement • Temperature measurement • Magnetic field measurement • Current measurement • Humidity measurement • LabVIEW Professional software license (Quantity will be decided later) **OEM/Country of Origin:** USA, Europe, Japan, Turkey, Korea	6	

Lab 2- Digital Systems and Computer lab

Sr.No#	Name of Item	Specification	Quantity	Quoted Model
1	Advanced Digital Systems powered by ZynQ7010 FPGA	ARM Cortex-A9 Dual-Core CPU (1 GHz), 28K Logic Cells (FPGA logic), 85 DSP Slices for signal processing, 52 Kb Block RAM, High-speed I/O interfaces (USB, PCIe, Ethernet), Programmable I/O pins up to 100, Support for multimedia, video, and audio interfaces **OEM/Country of Origin:** USA, Europe, Japan, Turkey, Korea	10	

Lab 3 - Power/Energy Systems and Advanced Electronics Lab

Sr.No#	Name of Item	Specification	Quantity	Quoted Model
1	**Advance Power Electronics Workbench**	with Modules/Equipment be capable of performing the following experiments/features or more: • Smoothing Inductors, Tandem Rheostats, IGBT Chopper/Inverter, Enclosure / Power Supply, Power Thyristors, Power Diodes, Speed Sensor / Tachometer, Data Acquisition, Interface for measurements, Chopper/Inverter Control Unit, Thyristor Firing Unit, Function Generator, PID Controller, Current/Voltage Isolator, Inertia Wheel, Three-Phase Wattmeter/Varmeter, Connection Lead Set Must cover below Topic Coverage • Power Diode Single-Phase and Two-Phase Rectifiers, Power Diode Three-Phase Rectifiers, The Power Thyristor, Introduction to AC Phase Control, Thyristor Single-Phase Bridge Rectifier/Inverter, Thyristor Three-Phase Rectifier/Inverter, Thyristor Three-Phase Six-Pulse Converter, Introduction to High-Speed Power Switching, The Buck Chopper, The Boost Chopper, The Buck/Boost Chopper, The Four-Quadrant Chopper, The Single-Phase Inverter, The Two-Phase Inverter, The Three-Phase Inverter, General Theory and Operation, Open-Loop Operation, Regulation Systems, Automatic Power-Factor Control using a Synchronous	3	

		Capacitor, Introduction to HVDC Power System Control, Manual and Automatic Control of HVDC Power Systems, Power Flow in HVDC Systems, Commutation at the Inverter End of an HVDC Power System, The Four-Quadrant Converter, A Four- Quadrant Converter Application, DC Motor Control using Speed Feedback, DC Motor Control using Speed and Current Feedback, The Buck Chopper Drive, The Buck/Boost Chopper Drive, The Four- Quadrant Chopper Drive, DC Motor Control using Speed and Current Feedback, Thyristor AC Motor Drives (29978-00), Induction-Motor Drive with Voltage Control, Wound-Rotor Induction-Motor Drive with Static Cascade, Saturation and Effect of Frequency in Magnetic Circuits, Three-Phase Voltage-Source Inverter Induction-Motor Drive, Constant V/f Ratio PWM-Inverter Induction-Motor Drive, Operation of a Synchronous Motor as a Stepper Motor, VSI Induction-Motor Drive Powered by a Phase-Controlled Thyristor Bridge, VSI Induction-Motor Drive Powered by a Buck Chopper, VSI Induction-Motor Drive Powered by a Thyristor Four-Quadrant Converter, VSI Induction-Motor Drive with Speed Feedback and Torque Limitation, VSI Induction-Motor Drive Powered by a DC Link with a Dump Resistor • Specifications: Smoothing Inductors, Inductance (1-2 or 5-6) 1.6 H, Inductance (3-4 or 7-8) 1.6 H, Maximum Current 0.75 A, Coil Resistance @ 25°C (1-2 or 5-6) 8.7 Ω, Coil Resistance @ 25°C (3-4 or 7- 8) 10.5 Ω, IGBT Chopper/Inverter, DC Bus, Maximum Voltage 690 V, Maximum Current 1.5 A, Filtering Capacitor 258 μF • Protections: DC Bus Overvoltage 690 V, DC Bus Circuit Breaker 1.5 A, IGBT Electronic Overcurrent 8 A, IGBT Overheat 60°C approx. Dumping Circuit, Voltage Threshold 660 V, Resistor 250 Ω, 100 W, Switching Control Signals, Level 0/5 V, Frequency Range 0-20 kHz, Minimum Dead Time 700 ns, Function Generator, Output Waveforms Sine wave, Square wave, Ramp, Frequency Ranges 0.1-1 Hz, 1-10 Hz, 10-100 Hz, and 100-1000 Hz, Amplitude 0-20 V p-p, Output Impedance 1 kΩ, Synchronization Output TTL Compatible, Pulse Waveform, 50% Duty Cycle, 5 V Amplitude, PID Controller • Rating (All Sections): DC Power Input ±15 V, 100 mA, Input Voltage 0 to ±12 V, Output Voltage 0 to ±12 V, Input Impedance 1 MΩ, Output Impedance 1 kΩ, Feedback amplifiers, Voltage Gain 1 to 10, Low-Pass Filters, Voltage Gain TTL compatible, Cut-off Frequency (Upper Filter) 0.2 Hz, Cut-off Frequency (Lower Filter) 0.2-70 Hz, Error Detector, Number of Inputs 3 (1 inverted, 2 non-inverted), Voltage Gain (for each input) 1, P.I.D. Amplifier, Proportional Gain (Low) 0.5-5, Proportional Gain (High) 5-50, Derivative Gain 0.005-0.5, Integral Gain 10-100, Summing Amplifier, Voltage Gain 1, Limiter, Output Voltage (Upper Limit) 0 to +14 V, Output Voltage (Lower Limit) 0 to -14 V Along with Data Acquisition and Control Interface. **OEM/Country of Origin:** USA, Europe, Japan, Turkey, Korea		

Lab 4 - Control Systems Lab

Sr.No#	Name of Item	Specification	Quantity	Quoted Model
1	QUBE-SERVO-2-USB Workstation	Compact and integrated rotary servo system - Tool-less quick connect module inter face - Direct-drive brushed DC motor High resolution optical encoder - Built-in voltage amplifier with integrated current and tachometer sensors - Integrated data acquisition (DAQ) device - Flexible QFLEX 2 computing interface for USB and SPI/QBus connections - User-controllable tri-color LED - Easy-connect cables and connectors - Open architecture design, allowing users to design their own controller - Fully compatible with MATLAB®/Simulink® and LabVIEW™ - Fully documented system models and parameters provided for MATLAB®/Simulink®, LabVIEW™ - Microcontroller examples and interfacing datasheet provided for the QUBE-Servo 2 Embedded **OEM/Country of Origin:** USA, Europe, Japan, Turkey, Korea	4	
2	Maglev Workstation	Complete System for lab including all accessories and cards for interfacing with computers must include below specifications or better. - Fully compatible with MATLAB®/Simulink® and LabVIEW™ - Real-time data acquisition (the vendor must provide DAQ card if data acquisition is achieved through DAQ) - Also required compatible desktop tower system - Open architecture design, allowing users to design their own controller - Modeling, analysis, and design of control systems **OEM/Country of Origin:** USA, Europe, Japan, Turkey, Korea	1	

Lab 5 - Instrumentation, Process Control and Automation Lab

Sr.No#	Name of Item	Specification	Quantity	Quoted Model
1	Time Sensitive Embedded Reconfigurable Trainer Board	• ARM Cortex-A based high-performance embedded system training Equipment for Linux-based device driver implementation and application. • Main module is an edge supercomputer with a built-in GPU of up to 21 TOPS level. Applications support popular AI frameworks such as TensorFlow2, PyTorch, Caffe/Caffe2, MXNet, Keras, etc. • Integrated configuration of main module that supports CUDA artificial intelligence acceleration calculation, speaker, digital array microphone, camera, high-precision environmental sensor, and breadboard.	2	

• User circuit configuration is possible through a breadboard, and application sensor modules are provided to integrate with the ARM Cortex-M processor • High-resolution dual CSI camera with an adjustable angle to enable image processing and deep learning-based vision processing learning is provided • Gigabit Ethernet, dual-band Wi-Fi, and Bluetooth for IoT service to support PLC equipment and OPC-UA communication • Support for MQTT-based IoT connectivity, OpenCV-based image processing, and QT-based GUI practice in conjunction with device driver • Support Xeus-python and Cling interpreter for aarch64 and VSCode-based IDE to enable learning C/C++ and Python 3 • Linux kernel configuration and build, system call, platform device driver, MISC device driver, and application program implementation contents are provided CPU: 6-core ARM GPU: 384-core NVIDIA Memory: 6GB DDR Storage: 16GB NVMe, 256GB SSD **APPLICATION EXPANSION MODULES:** Tiny-F405 Module Switch Module RGB LED Module Analog Module TPHG Sensor Module Thermopile Sensor Module TOF Sensor Module PGCA Sensor Module 9-Axis Sensor Module **ACCESSORIES:** Plateform OS and tools, 12V Adaptor, Micro SD Adapter, Programing Cable, Ethernet Cable, User Guide book **OEM/Country of Origin:** USA, Europe, Japan, Turkey, Korea	

Lab 6 RF/Wireless Communication Lab

Sr.No#	Name of Item	Specification	Quantity	Quoted Model
1.	**USRP-2900 Teaching Bundle**	70 MHZ -6 GHZ 2 tx ch 2 rx ch USB Interface Lab View Compatible	2	

lab 7 - Opto Electronics and Signal & Systems Lab

Sr.No#	Name of Item	Specification	Quantity	Quoted Model
1.	**Advanced Signal & Systems and DSP Trainer**	Modular trainer consists of following Digital Signal Processor and application modules: **DSP Module:** DSP : TMS320F28335 Device - High-Performance 32bit CPU - 6 Channel	3	

		DMA Controller - On-Chip Memory : 256k x 16 Flash, 34k x 16 SARAM - Boot ROM (8k x 16) - 12 Bit ADC, 16 Channel SRAM : 1Mbit (64k x 16bit), Switch 2EA, LED 2EA, JTAG port		
		Peripheral:		
		2pole DIP Switch 1EA BCD to FND 1EA : BCD value to 7-Segment display 16 x 2 Text LCD 1EA : E, RS, 4bit Data Variable DC : 0 ~ + 3.3V variable DC input Ext ADC RCA Port : External 0 ~ +3.3V range Signal input		
		DAC:		
		2CH, 10MHz speed Digital to Analog Converter per a channel		
		Signal Generator:		
		Sig A, Sig B, Mixer, Mod : Connected with each signal output RCA port and ADC block of DSP		
		Text LCD : Set output signal value display		
		Switch : Output signal set Switch and Initialization Switch		
		Waveform Generator : Waveform output set to Sig A, Sig B port		
		Waveform : Select of Sine, Triangle, Square waveform		
		Frequency : Select of 1, 2, 5, 10, 20, 50, 100, 200, 500, 1k, 2k, 5k, 10k, 20k, 50k, 100k output frequency		
		Amplitude : Select from 0Vp-p to 10Vp-p by 0.5Vp-p unit		
		Phase : Select to 345° at intervals of 15°		
		Bias : Select of -5V ~ +5V by 0.5V level unit		
		Mixing Signal : Signal Output from Audio Codec to Mixer port - Audio signal output		
		Modulation Signal : Modulation signal output of Sig A or Sig B with Set Frequency to Mod port		
		Sensor:		
		Photo Diode 1EA, Temperature Sensor 1EA : LM35D, Ultrasonic Sensor 1set : Transmit/Receive Block		
		Bio ECG:		
		ECG signal and Beat signal Measurement Block, Cable and Measuring Terminal included for Measurement		
		Communication:		
		CAN Transfer Block, IR Transmit /Receive Block, USB to Serial Block : Serial Communication Block		
		Motor:		
		DC Motor Block : +12V DC Geared/Encoder Motor, DC Motor Drive Block, PWM control, Encoder input		
		BLDC Motor Block : +12V Brushless DC Motor, BLDC Motor Drive Block, 3 phase PWM control, Hall Sensor input, Sensorless control		
		Audio:		
		Voice Recorder : SD1760P, 60 seconds recoding (8kHz Sampling), Reset, Record, Play, Erase, Forward, Volume Switch MIC. input speaker output (connected to MIC ln of Audio Codec)		
		Audio Codec : TLV320AIC23, MIC in, HP Out Connector, Line IN, Line Port, Can be used for input source		
		Oscilloscope:		
		2 CH, ±16V measuring range, 500kHz Sampling Speed, PC monitor by USB communication		
		Expansion Port:		
		Address, Data and Control signal of DSP module connected External expansion port		
		Power supplies:		
		+5V, +12V, -12V, +3.3V SMPS Power (50W)		
		ACCESSORIES:		
		User manual and CD, ECG Pad, USB cable, Power cable, RCA cable, DSP		

		JTAG and cable, ECG Probe cable, Oscilloscope Probe cable **OEM/Country of Origin:** USA, Europe, Japan, Turkey, Korea		

Lab 8 - Microwave and Antenna Lab

Sr.No#	Name of Item	Specification	Quantity	Quoted Model
1.	**Wireless & Antenna Test System**	• Standalone operation or PC dependent operation using an operation software • Multi-channel RF sources: 500MHz / 2GHz / 10GHz • Consists of various types of antenna such as Yagi, Dipole, Monopole and Microstrip • Can practice PWM and PLL-VCO (Phase Locked Loop-Voltage Controlled Oscillator) • Understanding the characteristics of various antennas and practicing frequency measurement and analysis • minimum 8 different antennas **RF Generator part** Frequency range — 500MHz, 2GHz, 10 GHz Power range — 10mW Approx Modulation frequency — 1kHz ±3% Channel — 500 MHz /900 MHz (32CH) Output dBm — 10dBm(Max) Output Impedance — 50 Ohm(Nominal) Type of antenna — Yagi, Dipole, Loop, Monopole, Spiral, Helical, Horn, Micro strip etc. **Receiver & Main Controller** Angle step — 400 steps (0.9˚/step) Control motor — 2 Phase stepping motor Angle Range — 0 ~ 360degree User Display — 16 x 2 Text LCD back light User LED — 5mm LED : 10ea Keys — Tack switch : 9ea PC interface and control — RS232C, 19200bps-8-N-1 Channel Switch — 8 bit dip switch PLL-VCO Lock — 5mm Yellow LED EXT. Input — EXT-PWM, EXT-Freq(SMA-KHD) INT. Output — PWM, VCO, Phase Shift, Ref-Frequency AC Power Input — AC 90~240V / 50~60㎐ DC Power output — DC -5V, +5V, +12V **Transmit part** Fixing(for polarized wave) — Horizontal/Vertical ANT. Directional control — Manual **Receive part**	2	

		Fixing Horizontal/Vertical ANT. Directional control Manual/PC interface for RS232C or USB **ACCESSORIES:** Power cord, RF cable (SMA to SMA) [1.5 meter], RF cable (SMA to SMA) [3 meter], BNC-SMA cable [1.5 meter], Motor cable, Serial cable, PC software CD/USB, User's guide manual **OEM/Country of Origin:** USA, Europe, Japan, Turkey, Korea		
2.	**Microwave & Microstrip Test System**	Microwave Application Set consists of modules which basic microwave applications can be performed. • Operating Frequency (except antenna): 50-3000MHz • Impedance: 50 Ohm • Antenna Operating Frequency: 2446-2454 MHz • RF Filters Insertion Loss: 1 dB max. • RF Power Divider Insertion Loss: 1 dB max. • RF Coupler Insertion Loss: 1 dB max. • RF Attenuator Attenuation: 20 dB • RF Coupler Coupling: 20 dB • Voltage Variable Attenuator Operating Voltage: 5V DC • Voltage Variable Attenuator Attenuation: 10dB-30dB • Spectrum Analyzer Dynamic range (for 35-3000 MHz): 75 dB • Spectrum Analyzer Maximum Span: 6165 MHz • Spectrum Analyzer BW: 200 KHz • Spectrum Analyzer Sweep 100 MHz: <0.25 sec • Spectrum Analyzer Noise floor up to 3000 MHz: <-90dBm • Spectrum Analyzer SWR: <1.5 **APPLICATION MODULES:** • RF Low Pass Filter Module • RF High Pass Filter Module • RF Band Pass Filter Module • RF Band Stop Filter Module • RF Divider Module • RF Coupler Module • 20dB RF Attenuator Module • RF Voltage Variable Attenuator Module • RF SWR Bridge • Microstrip Patch Antenna • Portable Spectrum Analyzer • Short circuit load set • Open Circuit Load, • 50 Ohm Load • Portable Spectrum Analyzer (Battery-Operated, Tracking Generator Output, USB/Wi-Fi, Touch Screen) **ACCESSORIES:** Storage box, Power cable, Connection cables, Experiment manual **OEM/Country of Origin:** USA, Europe, Japan, Korea, Turkey	1	

Lab 9 - Electrical Machines and Power Systems lab

Sr.No#	Name of Item	Specification	Quantity	Quoted Model
1.	**RT Electric Machine**	Opal RT Electric Machine Laboratory with OP4510• Opal RT Power Systems Laboratory with OP4510• OP5330 Analog Output (16 channels) RT-LAB® - Real-time Simulation Software• Time Sensitive Embedded Reconfigurable Industrial Controller• Motor Generator Pair (Pulley Drive)• Stepper Motor and Drive **OEM/Country of Origin:** USA, Europe, Japan, Korea, Turkey	2	

Note: Partial Bidding is allowed. If the delivered items are not match with the specifications, the delivery shall be rejected.

Financial Proposal/Technical Proposal will be evaluated on the basis of one person one Bid in terms of Rule 36A (PPRA Rules 2014). No serial # or item name will be changed in the financial proposal. The bidder will quote per unit rate with GST and Total amount with GST as per given serial number/item name in the bidding documents and final contract will be awarded as per item wise to the lowest bidder after completion of codal formalities through e-PADS. The bidder will follow the bidding documents in true letter and spirit.

Annexure- A   Technical Proposal Covering Letter

To

The Convener,
Purchase Committee,
University of Chakwal,
Chakwal.

Dear Sir,

We are hereby submitting our Proposal, which includes the Technical Proposal and the Financial Proposal sealed in two separate envelopes. We have attached the **Technical Bid Form**, **Check List, Detailed Specifications** and the required **supporting documents** along with our Technical Bid.

Yours sincerely,

Authorized Signature

(In full and initials)

Name and Designation of Signatory Name of Firm Address

Annexure- B   Check List

The bidder must attach this list along with the Bid

1.1. SUBMISSION AND ARRANGEMENT OF SUPPORTING DOCUMENTS WITH THE TECHICAL BID THROUGH E-PADS

The Bidder must upload all the Supporting Documents on E-Pads, number all the pages of supporting documents, provide the page information and arrange the documents in the following order:

	Enclosures of Technical Proposal	**Attached YES/NO**	**Page#**
1	**Covering Letter**		
2	**Copy of Bid Security**		
3	Copy of **Income Tax Registration Certificate**		
4	Copy of **Sales Tax Registration Certificate**		
5	Copy of **Professional Tax Certificate**		
6	**Affidavit/Undertaking** on the Stamp Paper		
7	Specifications of quoted items on the Letter Head of the bidder		
8	Three Supply Orders for supply of relevant items received in the past		
9	The specified **catalogues / brochures** of items quoted by the bidder		
Note: All the above documents and any other supporting document must be numbered and page number must be mentioned in the column specified for the purpose.			
Total Number of pages attached with the Technical Bid		**_____ Pages**	
8	**Tender Document** duly signed and stamped each page by the bidder must be attached at the end of the Technical Bid but numbering is not required for this document.		

	Enclosures of Financial Proposal	**Attached YES/No**	**Page #**
1	Financial Proposal Form duly filled, signed and stamped by the bidder		
2	Price Schedule Form duly filled, signed and stamped by the bidder		

Annexure- C

Bid Form

A) Profile of the Bidder:

S#	Particulars	BIDDER
1	Name of the Company	
2	Year of Incorporation	
3	**Registered Office**	
	Address	
	Office Telephone Number	
	Fax Number	
4	**Contact Person**	
	Name of Authorized Representative	
	Personal Telephone Number	
	Email Address	
5	**Registration Detail**	
	NTN Registration Number	
	GST Registration Number	

B) **Bid Security (Please do not mention amount of CDR)**

S#	Particulars	Please Furnish Details
1	Name of the Bank	
2	Instrument Number and Date	

Annexure- D

AFFIDAVIT/BIDDER'S UNDERTAKING ON THE STAMP PAPER

Ref: **Tender No. 09(C)/2024**

1. We have examined the Tender/Bid Document and we undertake to meet the requirements regarding supply of Items, warranty and services as required and are prescribed in the Tender Document.

2. It is certified that the information furnished here in and as per the document submitted is true and correct and nothing has been concealed or tampered with.

3. We have read the provisions of Tender/Bid Document and confirm that these are acceptable to us. We further declare that additional conditions, variations, deviations, if any, found in our response shall not be given effect to.

4. We agree to unconditionally accept all the terms and conditions set out in the Tender/Bid Document

5. We undertake, if our Bid is accepted, to supply the items within the delivery period mentioned in the Tender Document.

6. We understand that no document regarding evaluation criteria will be accepted after opening of the Technical Bids and we are bound to provide all the documentary proofs regarding evaluation criteria or any other supporting document at the time of opening of Technical Bids.

7. We agree that the Purchase Committee of University of Chakwal is not bound to accept the lowest or any of the bids received. We also agree that the Purchase Committee reserves the right in absolute sense to reject all the products/ services specified in the Bid Response without assigning any reason whatsoever under PPRA Rules 2014.

8. We also declare that our Company/Organization is not blacklisted from procuring agency.

[Name and Signatures of authorized Person along with stamp]

Annexure- E   **Financial Proposal Form**

(to be attached with Financial Proposal)

To

        The Convener,
        Purchase Committee,
        University of Chakwal,
        Chakwal.

Dear Sir,

With Reference to your Tender No.09(C)/2023 **Purchase of Lab Equipment for Electronics Engineering Department From Project Titled "Construction of Building at University of Chakwal City Campus"**
Please find attached our Financial Proposal for the sum of Rs. (insert amount in words and figures). This amount is inclusive of all taxes.

Yours sincerely,

Authorized Signature

Annexure- F   **Price Schedule**

(Please attach this page along with Financial Bid or quote rates on the Letter Head of the Bidder)

Purchase of Lab Equipment for Electronics Engineering Department From Project Titled

"Construction of Building at University of Chakwal City Campus"

Basic Electronics and Computer Lab

Sr.No#	Name of Item	Specification	Qty	Quoted Model	Unit Price (Including all Taxes)	Total Price (Including all taxex)
1	**Basic Electricity and Electronics Trainer**	Basic Electricity and Electronics Trainer Modular Electricity and Electronics Trainer with breadboard, metal casing and covering lid with Modules/Equipment be capable of performing the following experiments/features or more: DC Fixed Symmetric Power Supply 1: (-12V) - 0 - (+12V) DC DC Fixed Symmetric Power Supply 2: (-5V) - 0 - (+5V) DC DC Variable Power Supply: 0 - 36V / 0 - 1A AC Fixed Power Supply: 12V - 0 - 12V AC Function Generator: Sine, Triangle, Square (TTL) Amplitude Range: 0 - 10Vpp, Frequency Range: 10Hz - 100KHz Fixed Oscillator: 1Hz - 10Hz - 100Hz - 1KHz - 10KHz - 100KHz TTL TTL Pulse Generator: Negative and Positive TTL Pulse Generator: Negative and Positive, One shoot TTL Pulse Generator: Set - Reset – Preset Binary Switch and Indicator, 12 Bit, TTL 2x7 Segment Display / Decoder 8 Bit Logic LED Indicator 12V DC Double-contact Relay Potentiometer (1K - 10K - 100K) ON / ON Toggle Switch ON / OFF / ON Toggle Switch Buzzer 8 2W Speaker 12V Fleming Lamp APPLICATION MODULES OF ANALOG ELECTRONICS Application Modules should cover the experiment related to: • Examination of Resistance, Inductance, Capacitance in AC Examination of RL, RC, RLC serial circuits in AC • Examination of RL, RC, RLC parallel circuits in AC • Examination of parallel resonance • Examination of serial resonance • Examination of low - pass PI type filter • Examination of high - pass PI type filter • Examination of Transformer • Examination of the relation of magnet poles • Examination of magnetic field of magnet • Examination of barricading • Examination of electromagnet •	6			

		Resistance color codes and measurement • Examination of OHM Law • Examination of Kirchhoff's Voltage Law • Examination of Kirchhoff's Current Law • Examination of serial, parallel and assorted connected resistance • Examination of serial, parallel and assorted connected inductances • Examination of serial, parallel and assorted connected capacitors • Experiment of Superposition Theorem • Experiment of Thevenin Theorem • Experiment of Norton Theorem • Examination of diode • The characteristic curves of diode • Examination of half-wave rectifier • Examination of full-wave rectifier • Examination of bridge type full-wave rectifier • Examination of capacitor filter • The effect of current to the fitler • Examination of ¶ type filter • Examination of voltage multiplexer - duplex • Examination of voltage multiplexer - triplet • Examination of voltage multiplexer – quartet • Transistor output characteristics in first region • Transistor output characteristics in second region • Transistor output characteristics in third region • Transistor output characteristics in fourth region • Examination of Zener diode • Examination of regular circuits with Zener diode, • Examination of parallel regular rectifier • Examination of serial regular rectifier • Examination of ideal serial regular rectifier • Examination of the common emitter amplifier • Examination of common base amplifier • Examination of common collector amplifier • Examination of A class amplifier • Examination of B class amplifier • Examination of C class amplifier • Examination of audio amplifier with transistor • Examination of Integrated audio amplifier • Examination of J-FET input characteristics • Examination of J-FET output characteristics • Examination of Source grounded connection • Examination of E-MOSFET input characteristics • Examination of E-MOSFET output characteristics • Examination of E-MOSFET operation • Examination of RC phase-shift oscillator • Examination of LC oscillator •				

		Examination of Hartley oscillator Examination of Colpitts oscillator • Examination of Crystal oscillator • Examination of Wien Bridge oscillator APPLICATION MODULES OF DIGITAL ELECTRONICS Application Modules should cover the experiment related to: • Obtaining the truth table of AND Gate • Obtaining the truth table of 3 - Input AND Gate • Obtaining the truth table of NAND Gate • Using NAND Gate as an INVERTER • Generating 3 - Input NAND Gate using 2- Input NAND Gates • Obtaining the truth table of INVERTER Gate • Converting AND Gate into OR Gate by using INVERTER • Converting OR Gate into AND Gate by using INVERTER • Obtaining the truth table of OR Gate • Obtaining the truth table of 3 - Input OR Gate • Obtaining the truth table of NOR Gate • Using NOR Gate as an INVERTER • Obtaining 3 - Input NOR Gate using 2 - Input NOR Gates • Obtaining the truth table of EXCLUSIVE-OR Gate • Obtaining the truth table of EXCLUSIVE-NOR Gate • Examination of EXCLUSIVE-NOR Gate • Examination of COMMUTATIVE Law (OR GATE) • Examination of COMMUTATIVE Law (AND GATE) • Examination of ASSOCIATIVE Law (OR GATE) • Examination of ASSOCIATIVE Law (AND GATE) • Examination of DISTRIBUTIVE Law • Examination of IDEMPOTENCY Law • Examination of AND GATE Law • Examination of OR GATE Law • Examination of COMPLEMENT Law • Examination of INVOLUTION Law • Examination of ABSORPTION Law • Examination of DE MORGAN'S Law • R-S FLIP FLOP with NOR Gates • R-S FLIP FLOP with NAND Gates • R-S FLIP FLOP with clock • Obtaining the truth table of J-K FLIP FLOP • Obtaining the truth table of D FLIP FLOP • Obtaining the D FLIP FLOP using J-K FLIP FLOP • Obtaining the truth table of T FLIP FLOP • BINARY COUNTER application • Using BINARY COUNTER as BCD COUNTER • Examination of 7 bit BINARY COUNTER • Examination of Asynchronous up-counters composed of JK FLIP FLOP • Examination of Asynchronous down-counters composed of JK FLIP FLOP • Determining counting limits of Asynchronous counters • Examination				

		of HALF ADDER • Examination of FULL ADDER • Examination of HALF-SUBTRACTORS • Examination of FULL-SUBTRACTORS • Shift registers composed of FLIP FLOP • Serial - Parallel SHIFT REGISTERS Experiment • Right SHIFT REGISTERS Experiment • Left SHIFT REGISTERS Experiment • Parallel input - Parallel output SHIFT REGISTERS Experiment • Examination of 6116 RAM Integrated circuit • Examination of addressing 2816 EEPROM Integrated circuit Sliding letters experiment by using character generators and dot matrix • Examination of character generators and dot matrix • Examination of 8x1 MULTIPLEXER • Examination of 1x8 DE-MULTIPLEXER (DEMUX) • DATA Transfer MUX-DEMUX combination experiment • Analog - Digital Converters experiment ADC • Digital - Analog Converters Experiment DAC • Examination of DATA Transmission with A/D - D/A Convertors • Examination of 555 Integrated circuit as ASTABLE multivibration • Examination of 555 Integrated circuit as MONOSTABLE multivibrator • Examination of 555 Integrated circuit as BISTABLE multivibrator				
2	**Instrumentation Trainer**	Instrumentation Trainer with Modules Equipment be capable of performing the following experiments/features or more • Gas pressure measurement • Temperature measurement • Magnetic field measurement • Current measurement • Humidity measurement • LabVIEW Professional software license (Quantity will be decided later)	6			

Lab 2- Digital Systems and Computer lab

Sr.No#	Name of Item	Specification	Qty	Quoted Model	Unit Price (Including all Taxes)	Total Price (Including all taxex)
1	**Advanced Digital Systems powered by ZynQ7010 FPGA**	ARM Cortex-A9 Dual-Core CPU (1 GHz), 28K Logic Cells (FPGA logic), 85 DSP Slices for signal processing, 52 Kb Block RAM, High-speed I/O interfaces (USB, PCIe, Ethernet), Programmable I/O pins up to 100, Support for multimedia, video, and audio interfaces	10			

Lab 3 - Power/Energy Systems and Advanced Electronics Lab

Sr.No#	Name of Item	Specification	Qty	Quoted Model	Unit Price (Including all Taxes)	Total Price (Including all taxex)
1	**Advance Power Electronics Workbench**	with Modules/Equipment be capable of performing the following experiments/features or more: • Smoothing Inductors, Tandem Rheostats, IGBT Chopper/Inverter, Enclosure / Power Supply, Power Thyristors, Power Diodes, Speed Sensor / Tachometer, Data Acquisition, Interface for measurements, Chopper/Inverter Control Unit, Thyristor Firing Unit, Function Generator, PID Controller, Current/Voltage Isolator, Inertia Wheel, Three-Phase Wattmeter/Varmeter, Connection Lead Set Must cover below Topic Coverage • Power Diode Single-Phase and Two-Phase Rectifiers, Power Diode Three-Phase Rectifiers, The Power Thyristor, Introduction to AC Phase Control, Thyristor Single-Phase Bridge Rectifier/Inverter, Thyristor Three-Phase Rectifier/Inverter, Thyristor Three-Phase Six-Pulse Converter, Introduction to High-Speed Power Switching, The Buck Chopper, The Boost Chopper, The Buck/Boost Chopper, The Four-Quadrant Chopper, The Single-Phase Inverter, The Two-Phase Inverter, The Three-Phase Inverter, General Theory and Operation, Open-Loop Operation, Regulation Systems, Automatic Power-Factor Control using a Synchronous Capacitor, Introduction to HVDC Power System Control, Manual and Automatic Control of HVDC Power Systems, Power Flow in HVDC Systems, Commutation at the Inverter End of an HVDC Power System, The Four-Quadrant Converter, A Four- Quadrant Converter Application, DC Motor Control using Speed Feedback, DC Motor Control using Speed and Current Feedback, The Buck Chopper Drive, The Buck/Boost Chopper Drive, The Four- Quadrant Chopper Drive, DC Motor Control using Speed and Current Feedback, Thyristor AC Motor Drives (29978-00), Induction-Motor Drive with Voltage Control,	3			

| | | Wound-Rotor Induction-Motor Drive with Static Cascade, Saturation and Effect of Frequency in Magnetic Circuits, Three-Phase Voltage-Source Inverter Induction-Motor Drive, Constant V/f Ratio PWM-Inverter Induction-Motor Drive, Operation of a Synchronous Motor as a Stepper Motor, VSI Induction-Motor Drive Powered by a Phase-Controlled Thyristor Bridge, VSI Induction-Motor Drive Powered by a Buck Chopper, VSI Induction-Motor Drive Powered by a Thyristor Four-Quadrant Converter, VSI Induction-Motor Drive with Speed Feedback and Torque Limitation, VSI Induction-Motor Drive Powered by a DC Link with a Dump Resistor

• Specifications: Smoothing Inductors, Inductance (1-2 or 5-6) 1.6 H, Inductance (3-4 or 7-8) 1.6 H, Maximum Current 0.75 A, Coil Resistance @ 25°C (1-2 or 5-6) 8.7 Ω, Coil Resistance @ 25°C (3-4 or 7- 8) 10.5 Ω, IGBT Chopper/Inverter, DC Bus, Maximum Voltage 690 V, Maximum Current 1.5 A, Filtering Capacitor 258 µF
• Protections: DC Bus Overvoltage 690 V, DC Bus Circuit Breaker 1.5 A, IGBT Electronic Overcurrent 8 A, IGBT Overheat 60°C approx. Dumping Circuit, Voltage Threshold 660 V, Resistor 250 Ω, 100 W, Switching Control Signals, Level 0/5 V, Frequency Range 0-20 kHz, Minimum Dead Time 700 ns, Function Generator, Output Waveforms Sine wave, Square wave, Ramp, Frequency Ranges 0.1-1 Hz, 1-10 Hz, 10-100 Hz, and 100-1000 Hz, Amplitude 0-20 V p-p, Output Impedance 1 kΩ, Synchronization Output TTL Compatible, Pulse Waveform, 50% Duty Cycle, 5 V Amplitude, PID Controller
• Rating (All Sections): DC Power Input ±15 V, 100 mA, Input Voltage 0 to ±12 V, Output Voltage 0 to ±12 V, Input Impedance 1 MΩ, Output Impedance 1 kΩ, Feedback amplifiers, Voltage Gain 1 to 10, Low-Pass Filters, Voltage Gain TTL compatible, Cut-off Frequency (Upper Filter) 0.2 Hz, Cut-off Frequency (Lower Filter) 0.2-70 Hz, Error Detector, Number of Inputs 3 (1 inverted, 2 non-inverted), Voltage Gain | | | | |

		Specification				
		(for each input) 1, P.I.D. Amplifier, Proportional Gain (Low) 0.5-5, Proportional Gain (High) 5-50, Derivative Gain 0.005-0.5, Integral Gain 10-100, Summing Amplifier, Voltage Gain 1, Limiter, Output Voltage (Upper Limit) 0 to +14 V, Output Voltage (Lower Limit) 0 to -14 V Along with Data Acquisition and Control Interface.				

Lab 4 - Control Systems Lab

Sr.No#	Name of Item	Specification	Qty	Quoted Model	Unit Price (Including all Taxes)	Total Price (Including all taxex)
1	QUBE-SERVO-2-USB Workstation	Compact and integrated rotary servo system - Tool-less quick connect module inter face - Direct-drive brushed DC motor High resolution optical encoder - Built-in voltage amplifier with integrated current and tachometer sensors - Integrated data acquisition (DAQ) device - Flexible QFLEX 2 computing interface for USB and SPI/QBus connections - User-controllable tri-color LED - Easy-connect cables and connectors - Open architecture design, allowing users to design their own controller - Fully compatible with MATLAB®/Simulink® and LabVIEW™ - Fully documented system models and parameters provided for MATLAB®/Simulink®, LabVIEW™ - Microcontroller examples and interfacing datasheet provided for the QUBE-Servo 2 Embedded	4			
2	Maglev Workstation	Complete System for lab including all accessories and cards for interfacing with computers must include below specifications or better. - Fully compatible with MATLAB®/Simulink® and LabVIEW™ - Real-time data acquisition (the vendor must provide DAQ card if data acquisition is achieved through DAQ)	1			

- Also required compatible desktop tower system - Open architecture design, allowing users to design their own controller - Modeling, analysis, and design of controlsystems		

Lab 5 - Instrumentation, Process Control and Automation Lab

Sr.No#	Name of Item	Specification	Qty	Quoted Model	Unit Price (Including all Taxes)	Total Price (Including all taxex)
1	**Time Sensitive Embedded Reconfigurable Trainer Board**	▢ ARM Cortex-A based high-performance embedded system training Equipment for Linux-based device driver implementation and application. ▢ Main module is an edge supercomputer with a built-in GPU of up to 21 TOPS level. Applications support popular AI frameworks such as TensorFlow2, PyTorch, Caffe/Caffe2, MXNet, Keras, etc. ▢ Integrated configuration of main module that supports CUDA artificial intelligence acceleration calculation, speaker, digital array microphone, camera, high-precision environmental sensor, and breadboard. ▢ User circuit configuration is possible through a breadboard, and application sensor modules are provided to integrate with the ARM Cortex-M processor ▢ High-resolution dual CSI camera with an adjustable angle to enable image processing and deep learning-based vision processing learning is provided ▢ Gigabit Ethernet, dual-band Wi-Fi, and Bluetooth for IoT service to support PLC equipment and OPC-UA communication ▢ Support for MQTT-based IoT connectivity, OpenCV-based image processing, and QT-based GUI practice in conjunction with device driver ▢ Support Xeus-python and Cling interpreter for aarch64 and VSCode-based IDE to enable learning C/C++ and Python 3	2			

⬚ Linux kernel configuration and build, system call, platform device driver, MISC device driver, and application program implementation contents are provided CPU: 6-core ARM GPU: 384-core NVIDIA Memory: 6GB DDR Storage: 16GB NVMe, 256GB SSD **APPLICATION EXPANSION MODULES:** Tiny-F405 Module Switch Module RGB LED Module Analog Module TPHG Sensor Module Thermopile Sensor Module TOF Sensor Module PGCA Sensor Module 9-Axis Sensor Module **ACCESSORIES:** Plateform OS and tools, 12V Adaptor, Micro SD Adapter, Programing Cable, Ethernet Cable, User Guide book		

Lab 6 RF/Wireless Communication Lab

Sr.No#	Name of Item	Specification	Quantity	Quoted Model	Unit Price (Including all Tax)	Total Price (Including all tax)
1.	**USRP-2900 Teaching Bundle**	70 MHZ -6 GHZ 2 tx ch 2 rx ch USB Interface Lab View Compatible	2			

Lab 7 - Opto Electronics and Signal & Systems Lab

Sr.No#	Name of Item	Specification	Qty	Quoted Model	Unit Price (Including all Tax)	Total Price (Including all tax)
1.	**Advanced Signal & Systems and DSP Trainer**	Modular trainer consists of following Digital Signal Processor and application modules: **DSP Module:** DSP : TMS320F28335 Device - High-Performance 32bit CPU - 6 Channel DMA Controller - On-Chip Memory :	3			

		256k x 16 Flash, 34k x 16 SARAM - Boot ROM (8k x 16) - 12 Bit ADC, 16 Channel SRAM : 1Mbit (64k x 16bit), Switch 2EA, LED 2EA, JTAG port **Peripheral:** 2pole DIP Switch 1EA BCD to FND 1EA : BCD value to 7-Segment display 16 x 2 Text LCD 1EA : E, RS, 4bit Data Variable DC : 0 ~ + 3.3V variable DC input Ext ADC RCA Port : External 0 ~ +3.3V range Signal input **DAC:** 2CH, 10MHz speed Digital to Analog Converter per a channel **Signal Generator:** Sig A, Sig B, Mixer, Mod : Connected with each signal output RCA port and ADC block of DSP Text LCD : Set output signal value display Switch : Output signal set Switch and Initialization Switch Waveform Generator : Waveform output set to Sig A, Sig B port Waveform : Select of Sine, Triangle, Square waveform Frequency : Select of 1, 2, 5, 10, 20, 50, 100, 200, 500, 1k, 2k, 5k, 10k, 20k, 50k, 100k output frequency Amplitude : Select from 0Vp-p to 10Vp-p by 0.5Vp-p unit Phase : Select to 345° at intervals of 15° Bias : Select of -5V ~ +5V by 0.5V level unit Mixing Signal : Signal Output from Audio Codec to Mixer port - Audio signal output Modulation Signal : Modulation signal output of Sig A or Sig B with Set Frequency to Mod port **Sensor:** Photo Diode 1EA, Temperature Sensor 1EA : LM35D, Ultrasonic Sensor 1set : Transmit/Receive Block **Bio ECG:** ECG signal and Beat signal Measurement Block, Cable and Measuring Terminal included for Measurement **Communication:** CAN Transfer Block, IR Transmit /Receive Block, USB to Serial Block : Serial Communication Block **Motor:** DC Motor Block : +12V DC Geared/Encoder Motor, DC Motor Drive				

		Block, PWM control, Encoder input BLDC Motor Block : +12V Brushless DC Motor, BLDC Motor Drive Block, 3 phase PWM control, Hall Sensor input, Sensorless control **Audio:** Voice Recorder : SD1760P, 60 seconds recoding (8kHz Sampling), Reset, Record, Play, Erase, Forward, Volume Switch MIC. input speaker output (connected to MIC ln of Audio Codec) Audio Codec : TLV320AIC23, MIC in, HP Out Connector, Line IN, Line Port, Can be used for input source **Oscilloscope:** 2 CH, ±16V measuring range, 500kHz Sampling Speed, PC monitor by USB communication **Expansion Port:** Address, Data and Control signal of DSP module connected External expansion port **Power supplies:** +5V, +12V, -12V, +3.3V SMPS Power (50W) **ACCESSORIES:** User manual and CD, ECG Pad, USB cable, Power cable, RCA cable, DSP JTAG and cable, ECG Probe cable, Oscilloscope Probe cable **OEM/Country of Origin:** USA, Europe, Japan, Turkey, Korea				

Lab 8 - Microwave and Antenna Lab

Sr.No#	Name of Item	Specification	Qty	Quoted Model	Unit Price (Including all Taxes)	Total Price (Including all taxex)
1.	**Wireless & Antenna Test System**	• Standalone operation or PC dependent operation using an operation software • Multi-channel RF sources: 500MHz / 2GHz / 10GHz • Consists of various types of antenna such as Yagi, Dipole, Monopole and Microstrip • Can practice PWM and PLL-VCO (Phase Locked Loop-Voltage Controlled Oscillator) • Understanding the characteristics of various antennas and practicing frequency measurement and analysis	2			

		• minimum 8 different antennas				
		RF Generator part				
		Frequency range				
		Power range				
		Modulation frequency				
		Channel				
		Output dBm				
		Output Impedance				
		Type of antenna				
		Receiver & Main Controller				
		Angle step				
		Control motor				
		Angle Range				
		User Display				
		User LED				
		Keys				
		PC interface and control				
		Channel Switch				
		PLL-VCO Lock				
		EXT. Input				
		INT. Output				
		AC Power Input				
		DC Power output				
		Transmit part				
		Fixing(for polarized wave)				
		ANT. Directional control				
		Receive part				
		Fixing				
		ANT. Directional control				
		ACCESSORIES: Power cord, RF cable (SMA to SMA) [1.5 meter], RF cable (SMA to SMA) [3 meter], BNC-SMA cable [1.5 meter], Motor cable, Serial cable, PC software CD/USB, User's guide manual				
		OEM/Country of Origin: USA, Europe, Japan, Turkey, Korea				
2.	**Microwave & Microstrip Test System**	Microwave Application Set consists of modules which basic microwave applications can be performed. • Operating Frequency (except antenna): 50-3000MHz	1			

		• Impedance: 50 Ohm • Antenna Operating Frequency: 2446-2454 MHz • RF Filters Insertion Loss: 1 dB max. • RF Power Divider Insertion Loss: 1 dB max. • RF Coupler Insertion Loss: 1 dB max. • RF Attenuator Attenuation: 20 dB • RF Coupler Coupling: 20 dB • Voltage Variable Attenuator Operating Voltage: 5V DC • Voltage Variable Attenuator Attenuation: 10dB-30dB • Spectrum Analyzer Dynamic range (for 35-3000 MHz): 75 dB • Spectrum Analyzer Maximum Span: 6165 MHz • Spectrum Analyzer BW: 200 KHz • Spectrum Analyzer Sweep 100 MHz: <0.25 sec • Spectrum Analyzer Noise floor up to 3000 MHz: <-90dBm • Spectrum Analyzer SWR: <1.5 **APPLICATION MODULES:** • RF Low Pass Filter Module • RF High Pass Filter Module • RF Band Pass Filter Module • RF Band Stop Filter Module • RF Divider Module • RF Coupler Module • 20dB RF Attenuator Module • RF Voltage Variable Attenuator Module • RF SWR Bridge • Microstrip Patch Antenna • Portable Spectrum Analyzer • Short circuit load set • Open Circuit Load, • 50 Ohm Load • Portable Spectrum Analyzer (Battery-Operated, Tracking Generator Output, USB/Wi-Fi, Touch Screen) **ACCESSORIES:** Storage box, Power cable, Connection cables, Experiment manual **OEM/Country of Origin:** USA, Europe, Japan, Korea, Turkey				

Lab 9 - Electrical Machines and Power Systems lab

Sr.No#	Name of Item	Specification	Quantity	Quoted Model	Unit Price (Including all Taxes)	Total Amount (Including all Taxes)

1.	**RT Electric Machine**	Opal RT Electric Machine Laboratory with OP4510• Opal RT Power Systems Laboratory with OP4510• OP5330 Analog Output (16 channels) RT-LAB® - Real-time Simulation Software• Time Sensitive Embedded Reconfigurable Industrial Controller• Motor Generator Pair (Pulley Drive) • Stepper Motor and Drive **OEM/Country of Origin:** USA, Europe, Japan, Korea, Turkey	2			

Annexure- G Contract Agreement Form

THIS AGREEMENT made the *[day]* day of *[month] [year]* between *[University of Chakwal]* (hereinafter called "the University") of the one part and *[name and address of Supplier]* (hereinafter called "the Supplier") of the other part:

WHEREAS the University invited Tenders for certain goods and related services, viz, *[brief description of goods and related services]* and has accepted a Tender by the Supplier (Supply of Lab Equipment) for the supply of those goods and related services in the sum of Rs. **[Contract Price in figures and in words]** (hereinafter called "the Contract Price").

NOW THEREFORE the parties hereby agree as follow:

1- The following documents attached shall be deemed to form and integral part of this Contract:

        i-   Tender/Bid Document

        ii-   Letter of Acceptance

        iii-   Performance Guarantee equal to 10% of Contract Price in shape of CDR, Demand Draft or Pay Order.

2- The Terms and Conditions of Supply Order/Contract given in the Tender/Bid Document will be applicable.

3- The mutual rights and obligations of the University and the Supplier will be preserved in the light of the Terms and Conditions mentioned in the Tender /Bid Document.

IN WITNESS whereof the parties have caused this Contract to be executed in accordance with the laws of Pakistan on the day, month and year written above.

For University of Chakwal   **For the Supplier:**

Signature   Signature

Print Name

 Title