Tender Documents for the Supply of

1. **Dynamics of Machinery**
2. **Fluid Mechanics**
3. **Measurements of Metrology**
4. **Heat Transfer**
5. **Electronics & Communication Engineering Lab Equipments**

To
KU College of Engineering & Technology

Kakatiya University

Gundla Singaram, Hanamkonda
Dist: Warangal – 506 009, Telangana State

KAKATIYA UNIVERSITY

Warangal – 506 009, Telangana

No. 202/KUCE&T/2016 Dated: 12-07-2016

TENDER NOTIFICATION

Sealed tenders are invited for the supply of laboratory equipment for KU College of Engineering & Technology. Detailed tender documents with specifications, terms and conditions etc., can be had from the website www.kakatiya.ac.in. The last date for receipt of the tender is 26-07-2016.

PRINCIPAL

Tender Summary

Tender Number	202/KUCE&T/2016 Dated: 12- **07-2016**
Amount of EMD (Rs.)	2.5 % of the quoted value
Tender Document Cost (Rs.) (Downloadable one)	Rs.5000/- (D.D.in favour of Principal, KU College of Engineering & Technology, Warangal- 506009, Telangana State, India)
Bid Submission	**26.07.2016**
Bid Outer Cover opening	**26.07.2016 (after 5.00 PM)**
Bid opening (Technical)	Will be decided on the day of opening.

PRINCIPAL

Table of Contents

1. Introduction

Kakatiya University was established on 19th August, 1976 in the combined State of Andhra Pradesh to fulfill the aspirations of the Telangana people for higher education. The founding of the University was in fact a historic event in the sense that heralded a new era in the realms of higher education of this region. The erstwhile Post-Graduate Centre of Osmania University was upgraded and named "Kakatiya University" for residential teaching, research and affiliation. The development of the University over the years has been gradual but impressive. The University was initially accredited with B+ grade by the NAAC in 2002 and reaccredited with A grade in 2008.

The University is now offering programmes in Engineering, Pharmacy, Law, Computer Science, Business Management, Education, Science, Arts, Commerce, Oriental courses in the University, constituent and affiliated colleges located in three districts of Northern Telangana State, viz., Warangal, Khammam and Adilabad. In addition, the School of Distance Learning and Continuing Education (SDLCE) is offering a large number of programmes through distance mode. Further, the University is vibrant with research activities carrying out the projects sponsored by various funding agencies like UGC, DST, CSIR, ICSSR, AICTE, ICHR, DBT, etc.

Now, Kakatiya University is about to cross the milestone of forty (40) years and is poised to achieve greater academic excellence with dedication and commitment in the years to come.

2. INVITATION FOR BIDS

1. This invitation to the tenderer is for the supply of the Laboratory Equipment for Dynamics of Machinery, Measurements & Metrology, Fluid Mechanics, Heat Transfer and Electronics & Communication Engineering to Kakatiya University College of Engineering & Technology, Gundla Singaram, Hanamkonda, Warangal District – 506009 – Telangana State.

2. Tenderers are advised to study the tender document carefully. Submission of tender shall be deemed to have been carried out after careful study and examination of the tender document with full understanding of its implications.

3. Sealed offers prepared in accordance with the procedures enumerated in the instructions to Tenderers (3) clause 1 should be submitted to the office of

   The Principal, KU College of Engineering & Technology, Kakatiya University, Gundla Singaram, Hanamkonda, Dist. Warangal – 506 009 (Telangana State)

   not later than the time laid down, at the address given in the schedule for invitation to tender under Clause 6.

4. **All bids must be accompanied by an Earnest Money Deposit (EMD) of 2.5% of the quoted value of all the instruments, and D.D. of Rs. 5000/- towards document cost (Download one) in favour of The Principal, KU College of Engineering & Technology, Warangal (Separate D.D. for Document Cost and EMD & Separate Bid for each Laboratory Equipments).**

5. This tender document is not transferable.

5. Schedule for invitation to tender

Last date for submission of bid documents	**26.07.2016**
Date till which the Bid is Valid	**180 days from the date of submission**
Venue of submission of Bid documents	**Office the Principal KU College of Engineering & Technology, Gundla Singaram Road, Kakatiya University, Warangal-506009**

7. Tender through e-mail/fax will not be considered. **Tender form without the Commercial bid will not be considered.**

Note: The University shall not be responsible for any postal delay about non receipt/non delivery of documents.

3. INSTRUCTIONS TO TENDERERS

A. Introduction

(i). Bid Submission Procedure

Two-Cover-System is to be followed for this tender, i.e., (a) Technical Bid in a separate Cover and (b) Commercial Bid in a separate Cover.

i.1 Technical and Commercial Bid by the Tenderer(s) should be placed in two separate envelopes super-scribed with separate bid titles as follows:

a) Technical Bid (2 copies) with **EMD amount and document cost**.
b) Commercial Bid (2 copies).

Tender without the Commercial Bid will be rejected.

Tender should be submitted separately for each Laboratory Instruments.

1.2. The tenderers have to qualify for the commercial bid.

1.3. Please note the price should be mentioned only in the Commercial Bid.

1.4. Item-wise-pricing should be given in the commercial bid as per the format specified.

1.5. All the documents, viz., Technical Bid and Commercial Bid prepared as above are to be kept in two sealed covers super-scribed with Tender Number, Due Date, Name of Laboratory, and **"Do not open before, 26.07.2016" s**hould be specified.

1.6. The cover thus prepared should also indicate **clearly the name and address of the Tenderer.**

P.S.: In case, fine tuning of technical specifications are required, the University Reserves the Right to Ask for Revised Technical Bid. In the absence of revised Commercial Bid, the original shall be held valid.

(ii). Cost of Tender

2.1 The Tenderer shall bear all costs associated with the Preparation and Submission of Bid, including cost of presentation for the purposes of clarification of the Bid.

2.2 If so desired by the University and University will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the Tendering Process.

(iii). The Tenderer is expected to examine all instructions, forms, terms and specifications in the Tender Document. Failure to furnish all information required in the Tender Document or Submission of a bid not substantially responsive to the Tender Document in every respect will be at the Tenderer's risk and may result in the rejection of the Bid.

(iv). Clarification of Tender Document

A prospective Tenderer requiring any clarification of the Tender Document May notify the University in writing at the University's mailing address.

The University will respond in writing to any request for clarification of The Tender Document, received. Written copies of the University response (including and explanation of the query, but without identifying the source of inquiry) will be given to all prospective Tenderers who have received the Tender Documents.

(v). Amendment of Tender Document.

5.1. At any time the University may for any reason, whether at its own initiative or in response to a clarification requested by a prospective Tenderer, modify the Tender Document by an amendment.

5.2. The amendment will be notified in writing or by fax or email or cable to all prospective Tenderers who have received the Tender Documents and will be binding on them.

5.3. In order to afford prospective Tenderers reasonable time in which to take the amendment into account in preparing their bids, the University may, at its discretion, extend the last date for the receipt of Bids.

B. **Preparation of Bids**

6. Language of Bids

The Bids prepared by the Tenderer and all correspondence and documents relating to the bids exchanged by the Tenderer and the University shall be written in English.

7. Documents Comprising the Bids

The Bids prepared by the Tenderers shall comprise of following components:

(a) Annexure A:

Sl. No	Eligibility Criteria	Requisite Document
1	The Tenderer must have reputed dealing Electrical equipments for The last five years.	Qualifying data duly filled in as per relevant Proforma provided in the bid proposal that the Tenderer is eligible to bid and is qualified to perform the contract, if its bid is accepted (Proforma)
2	The Tenderer company must have a valid latest Income-Tax Certificate.	Copy of Latest Valid Income Tax Clearance Certificate / PAN Certificate. **(Not Necessary for foreign companies)**
3	EMD – 2.5% of the quoted value	DD in Favour of The Principal, **KU College of Engineering & Technology, Warangal** – 506 009 – Telangana State – India
4	Cost of the Tender document (For each instrument)	Rs. 5000/- (D.D.in favour of The Principal **KU College of Engineering & Technology, Warangal** – 506 009 – Telangana State – India
5	The Tenderer must submit proposal sheet as per terms of the Tender document certifying that they accept all terms and Conditions of the Tender Document	Bid Proposal sheet duly filled in, signed and complete in all Aspects. (Proforma -I)
6	Is the Tenderer a Public/Private Limited Company having its Corporate/Head Office in Telangana State and a local direct office either in Hyderabad or Warangal?	Address, Contact Person, Phone/Fax/Email of all Directors along with PAN / IEC / VAT /TAN/TIN Service Tax Details. Registration No along With Date of Registration is to be provided.
7	Are they authorized for the equipment quoted by the Manufacturer?	Letter of authorization from the manufacturer

(b) Technical Bid shall consist of following: -

1	Technical Details
2	Name & Designation of the person responding to the tender
3	Name & Designation of person for contact

(c) Commercial Bid shall consist of the following: -

1	Commercial Deviations
2	Commercial Bid

i) Bid prices duly filled, signed and complete as per the Price Schedule on the prescribed Quotation Proforma (Proforma-IV). The Tenderer shall indicate the firm prices, the Terms of Reference of which are given in the Technical Specifications. Two Soft copies of deviations in the specified format given in Proforma-IV.

ii) Commercial Deviations from the terms and conditions and specifications as specified in the Bidding Documents (Proforma-V). Two Soft copies of deviations in the specified format given in Proforma-V. The University reserves the right to carry out the capability assessment of the Tenderers and is not bound to place order on the lowest bidder. The University's decision shall be final in this regard.

4. Terms and Conditions of the Tender

4.1. DELAY IN THE VENDOR'S PERFORMANCE & PENALTY:

4.1(a) Delivery of the Goods and performance of Services shall be made by the Vendor in accordance with the time schedule specified by the purchaser in this schedule of requirement.

4.1(b) An unexcused delay by the vendor in the performance of its delivery obligations shall render him liable to any or all of the following penalties: Imposition of liquidated damage and termination of this order for default.

4.2. PROFESSIONAL PRACTICE

The Tenderer shall adhere to professional engineering and consulting standards recognized by international professional bodies and shall observe sound management, technical and engineering practices. It shall employ appropriate advanced technology and safe and effective equipment, machinery, material and methods. The Tenderer shall always act in respect of any matter relating to this contract, as faithful advisors to the University and shall, at all times, support and safeguard the University's legitimate interests in any dealings with the third party.

4.3. USE OF CONTRACT DOCUMENTS AND INFORMATION

4.3(a) The Tenderer shall not, without the University's prior written consent, disclose the contract or any provision thereof, or any specification, plan, drawing, pattern, sample or information furnished by or on behalf of University in connection there with to any person other than a person employed by the Tenderer in the performance of the contract. Disclosure to any such employed person shall be made in confidence and shall extend only as far as may be necessary for purposes of such performance.

4.3(b) The Tenderer shall not without the purchaser's prior written consent, make use of any document or information.

4.3(c) Any document other than the contract itself shall remain the property of the University and shall be returned (in all copies) to the University on completion of the tenderers performance under the contract if so required by the University.

4.4. EARNEST MONEY & SECURITY DEPOSIT:

Vendor/Tenderer(s) shall deposit EMD along with the tender document in the form of Bank Demand Draft in favour of the Principal, KU College of Engineering & Technology, Warangal. Tenders without Earnest Money will be rejected.

4.5. SCHEDULE OF PAYMENT:

4.5.1. Payment will be made only after the installation of the items and after issue of certificate by the Committee.

4.5.2. VAT / Sales Tax, Services Tax and Octroi shall be paid on actual, as applicable.

4.5.3. Tenderer should specify the TAN / PAN/TAN/TIN.

4.5.4. All payments shall be released within thirty (30) days from the date of submission of bills in triplicate to the Principal, Kakatiya University College of Engineering & Technology, Gundla Singaram, Warangal – 506 009.

4.6. WARRANTY PERIOD AND MAINTENANCE SERVICES:

The Vendor will be responsible for the comprehensive maintenance (free of charge) during the warranty period of 36 months for Equipments (Active components) after the implementation at Kakatiya University College of Engineering & Technology, Gundla Singaram, Warangal – 506 009.

4.7. PRICES

The prices quoted for the Items/Services shall be firm throughout the period of contract & this contract will be valid up to the date of final payment to the supplier and shall not be subject to any upward modification whatsoever. The rates should be quoted for CIP at

sites. The commercial bids must be on the prescribed format as given in this document.

4.8 TAXES AND DUTIES

The Tenderer shall be entirely responsible for all taxes, duties, license fees, Octroi, etc. incurred until delivery of the ordered Goods to the purchaser. However, VAT / Sales Tax, Surcharge, Professional / Service Tax, Octroi in response of the transaction between the purchaser and the Tenderer shall be payable extra by the purchaser if so stipulated in the notification award.

4.9 INSURANCE

The Tenderer shall be responsible for all the Goods supplied under the contract and these shall be fully insured against loss or damage incidental to manufacture or acquisition transportation, storage, delivery, and installation, commissioning and running.

4.10 TENDERER'S PERSONNEL

The Tenderer shall employ and provide such qualified and experienced personnel as required to perform the services under the contract.

4.11 CONFIDENTIALITY

The Tenderer and their personnel shall not, either during the term disclose any proprietary or confidential information relating to the services, contract or the University's business or operations without the prior written consent of the University.

4.12 FORCE MAJEURE

Notwithstanding the provisions of the tender, the Tenderer shall not be liable for forfeiture of its performance security, liquidated damages or termination for default, if and to the extent that it's delay in performance or other failure to perform its obligations under the contract is the result of an event of Force Majeure.

4.12(a) For purposes of this Clause, "Force Majeure" means an event beyond the control of the Tenderer and not involving the Tenderer and not involving the Tenderer's fault or negligence and not foreseeable. Such events may include, but are not restricted to, acts of the University, either in its sovereign or contractual capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes.

4.12(b) If a Force Majeure situation arises, the Tenderer shall promptly notify the University in writing of such conditions and the cause thereof. Unless otherwise directed by the University in writing, the Tenderer shall continue to perform its obligations under this order as far as reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event, the University may terminate its order by giving a written notice of minimum 30 days to the Tenderer, if as a result of Force Majeure, the Tenderer being unable to perform a material portion of the services for a period of more than 60 days.

4.13. The University reserves the right to accept or reject any Tender in whole or in part without assigning any reason therefore.

4.14. The University is under no obligation to accept the lowest Tender.

4.15. OTHER CONDITIONS

4.15(a) All disputes, differences, claims and demands arising under or pursuant to or touching the contract shall be referred to the sole arbitrator of the **Principal**, Kakatiya University College of Engineering & Technology, Warangal – 506 009. The award of the sole arbitrator shall be final and binding on both the parties under the provisions of the arbitration Act, 1940 or by statutory modification re-enactment thereof for the time being in force. Such arbitration shall be held at Warangal Jurisdiction only.

4.15(b) In all matters and disputes arising there under, the appropriate Courts at Warangal Jurisdiction shall have jurisdiction to entertain and try them.

4.15(c) Reputed manufacture/ Authorized dealers /Registered Contractor have EA/ESA Certificate with validity

5. Detailed Technical Specifications

Please refer Annexure - I.

6. Bid Proposal Proforma

Proforma –I

BID PROPOSAL SHEET

Tenderer's Proposal Reference No. & Date :
Tenderer's Name & Address :
Person to be contacted :
Designation :

Telephone No. Email Id. : Fax No :

To:
Principal.
KU College of Engineering &
Technology
Kakatiya University
Warangal – 506 009

Subject: Proposal for supply of systems

Dear Sir,

1.0 We, the undersigned Tenderers, having read and examined in detail the specifications and all bidding documents in respect of supply of systems do hereby purpose to provide Hardware & Technical Services as specified in the bidding document.

2.0 PRICE AND VALIDITY

2.1 All the prices mentioned in our proposal are in accordance with the terms as specified in bidding documents. All the prices and other terms and conditions of this proposal are valid for a period of 180 calendar days from the date of opening of the bids.

2.2 We do hereby confirm that our bid prices include all taxes including Income Tax & Professional Tax.

2.3 We have studied the Clauses relating to Indian Income Tax and hereby declare that if any Income Tax, Surcharge on Income Tax and any other Corporate Tax is altered under the law, we shall pay the same.

3.0 EARNEST MONEY

We have enclosed the earnest money (2.5% of the quoted value) and cost of the tender document (Rs.5000/-) in the form of Bank Demand Draft
of _____. It is liable to be forfeited in accordance with the provisions of tender document.

3.1 DEVIATIONS

We declare that all the services shall be performed strictly in accordance with the Technical specifications and other tender document except the deviations as mentioned in the Technical deviation Proforma (Proforma - IV). Further we agree that additional conditions, if any, found in the proposal documents, other than those stated in deviations Proforma, shall not be given effect to.

3.2 BID PRICING

We further declare that the prices stated in our proposal are in accordance with your terms & conditions in the bidding document

3.3 QUALIFYING DATA

We confirm having submitted in qualifying data as required by you in your tender Document. In case you require any further information/ documentary proof in this regard before evaluation of our bid, we agree to furnish the same in time to your satisfaction.

4.0 We hereby declare that our proposal is made in good faith, without collusion or fraud and the information contained in the proposal is true and correct to the best of our knowledge & belief.

Thanking you,

Yours faithfully,

(Signature)

Date:
Place:
Business Address:

Name:
Designation:
Seal

Proforma -II

PARTICULARS OF TENDERER(S)
TENDERER'S PARTICULARS FOR TENDER NO. _____

1. Name of the Tenderer : _____

2. Address of the Tenderer : _____
_____

3. Year of Establishment : _____

4. Name of the affiliated firms (if any) : _____

5. Tenderer's proposal number & date : _____

6. Name & address of the officer : _____
to whom all references shall be _____
made regarding this tender. _____

7. Annual turnover of the firm for the : _____
last year and name of the _____
Institutions / Universities where the network
Has been established. (separate List of
Institutions Universities may be furnished)

8. Contact Person/ Address/Telephone Nos. _____
of the office who will be responsible for _____
Executing this project. _____

9. Earnest Money Deposited: _____
DD NO/ Bank Details
Telex:
Telephone:
Fax No:

As of this date the information furnished in all parts of this form is accurate and true to the best of my knowledge.

Witness:

Signature	_____	Signature	_____
Name	_____	Name	_____
Designation	_____	Designation	_____
Address	_____	Address	_____
Company	_____	Company	_____
Date	_____	Date	_____

Company Seal
(With name & designation
Of the person signing the tender)

Proforma - III

TECHNICAL DEVIATIONS

Subject: Technical Deviations.

Dear Sir,

Following are the Technical deviations & variations from the expectations to the specifications. These deviations and variations are exhaustive. Except these deviations and variations, the entire equipment shall be provided as per your specifications and documents. A soft copy of the format should be submitted duly filled in, on the CD. In case of any variation between the soft and hard copy versions, the Principal, Kakatiya University, Warangal – 506 009 will consider the hard copy version.

S.NO	Clause. No	Page No	Statement of Deviations and Variations

Date

Place

Signature

Name

Seal

Proforma-IV

PRICE SCHEDULE

Please fill in all the fields of the format.

Sl.No	Item	Qty	Total Price in Figures (Rs)	Total Price in Words (Rs)

Date

Place

Signature

Name

Seal

Performa - V

COMMERCIAL DEVIATIONS

Subject: Commercial Deviations

Dear Sir,

Following are the Commercial deviations & variations from the exceptions to the specifications of hardware. These deviations and variations are exhaustive. Except these deviations and variations shall be provided as per your specifications and documents.

S.No	Clause No	Page No	Statement of deviations and variations

Date

Place

Signature

Name

Seal

7. Abbreviations and Acronyms

Acronym & Abbreviation	Description
EMD	Earnest Money Deposit
DD	Demand Draft
CD	Compact Disc
IEC	Importer – Exporter Code
LAN	Local Area Network
WAN	Wide Area Network
VAT	Value Added Tax
CEO	Chief Executive Officer
UGC	University Grants Commission
AMC	Annual maintenance Cost
PAN	Permanent Account Number
TAN	Tax deduction and Collection Account Number
TIN	Tax Information Network
CIP	Carriage Insurance paid to

Annexure A:

Commercial Compliance Statement: (Note: Fill up legibly)

Sl No	Eligibility Criteria	Yes/No	Documents Attached
1	Is the Tenderer have repute dealing with Electrical Systems for the last five years?		
2	Does the tenderer have ISO 9001 Certification For its services Practice?		
3	Does the Tenderer have a valid Latest Income Tax Certificate?		
4	Has the tendering company posted profit, having a turnover of at least 5 times of the quoted value for the last three financial years?		
5	EMD – 2.5% of the quoted value		
6	Cost of tender document (Rs. 5000/-) for each instrument		
7	Has the Tenderer submitted proposal sheet as per terms of the Tender document certifying that they accept all terms and Conditions of the Tender Document?		
8	Is the Tenderer a Private / Public Limited Company having its resident engineer Corporate/Head Office in Hyderabad / Warangal and a local direct office in Hyderabad / Warangal?		
9	Are they authorized for the equipments quoted by the Manufacturer?		

Annexure - I

1. **Technical Specification for Laboratory Equipment for**
   A) Mechanical Engineering:
   (1) Dynamics of Machinery, (2) Measurements & Metrology, (3) Fluid Mechanics & Hydraulic Machines, and (4) Heat Transfer.

   B) Electronics & Communication Engineering.

DYNAMICS OF MACHINERY

Sl.No.	Item	Qty
1	Motorized Gyroscope Optical: Digital Tachometer- Non contact and contract type	1
2	Static and Dynamics Balancing Apparatus Rotating mass system. 1/4th HP AC/DC Motor, 2 diff sets of bearing belts- self aligned, fixed type. . Optional feature Computer data acquisition system with software.	1
3	Whirling of Shaft Apparatus /6th HP AC/DC Motor, 2 diff sets of bearing belts- self aligned, fixed type. Optional feature Computer data acquisition system with software.	1
4	Governor apparatus – Watt, Porter, Proell & Hartnell Governor set up0.5 H.P PMDC motor	1
5	Cam Analysis – Optional: Digital Stroboscope	1
6	Vibration Lab (**Universal** Vibration Apparatus) (Model no: DOM 007) Spring mass system. Equilibrium spring mass system (forced vibrations), Torsional vibrations Natural frequency **Universal** Vibration System	1

MEASUREMENT AND METROLOGY

Sl.No.	Item	Qty
1	Vernier Height guage 0-300mmX0.2mm Mitutoyo: Analog to 0 to 300 mm With Manual	**1**
2	Vernier Caliper 0-150mmX0.2mm Mitutoyo With Manual	**1**
3	Bevel Protector 0-360 Deg. German Make: Analog to 0 to 25 mm With Manual	**1**
4	A.Sine Bar 250mm INDIAN Make B. Sine Center Indian make 200mm With Manual	**1**
5	Floating carriage diameter measuring machine 3 wire testing with std Acc… INDIAN With Manual	**1**
6	Digital Micrometer Mitutoyo: 0-25m: With Manual	**1**
7	BORE GAUGE 35-60.mm Mitutoyo With Manual	**1**
8	Slip Gauge set Specifications 8 to 35 mm With Manual	**1**
9	Ring Gauge 10mm i)Plain ii)Thread With Manual	**1**
10	Plug Gauge 10mmi)Plain ii)Thread With Manual	**1**
11	Pneumatic Dial Comparator A. Digital Electronic comparator B. Mechanical comparator C. .Holding stand for above item N.9b With Manual	**1**
12	Mitutoyo Portable surface Roughness Teaster: Talysurf. With Manual	**1**
13	Profile Projector -Optional Accessories Projection lens – 100X200/.02 0 to 30 mm	**1**
14	Spirit Level 200/.02 With Manual	**1**

FLUID MECHANICS LAB

Sl.No.	Item	Qty
1	Meta centric Height Apparatus: With Manual	**1**
2	Flow Through Notch Apparatus. SPECIFICATIONS: pump kirloskr 0.5 HP Monoblock, 1phase rectangular, V-notch 600 Piezometer: 400mm long, transparent acrylic with scale PUMP: standard make, 0.5 hp TANKS: sump tank-72 liters capacity Notch tank: 122 litters capacity overflow arrangement & butterfly valve Pump Starting: Standard make starter with indicator Hook guage: 300mm height with transparent base and vertical moment Controlling Valves: 1no., 1 wheel valve, standard make Supply: 1 ph 220 v 6 amps to	**1**

	be provided by user. With Manual	
3	Flow Through Orifice & Mouth Piece Apparatus. **Specifications**: Pump: Kirloskr 0.5 HP Monoblock, 1phase. ORIFICE METER: Transparent acrylic body inlet dia 25mm, throat dia 12.5mm S.S orifice body inlet dia 25mm, throat dia 12.5mm MANOMETER: Transparent acrylic mercury column, 550mm height, U-tube. PIEZOMETER. Transparent acrylic of 400mm long with scale PUMP: 0.5 hp standard make TANKS(S.S) Sump tank -61 liters capacity with over flow arrangement & butterfly valve PUMP STARTING: Standard make starter with indicator PRESSURE TAPPING VALVES: 4nos ¼ wheel valve standard make SUPPLY: 1ph 220 v 6amps to be provided by user. With Manual	**1**
4	Closed circuit Apparatus for determation of losses in pipelines due to sudden contraction, Kirloskar 0.5 HP Mono block, 1ph. G.I Fittings: Sudden contraction and expansion colour union 900 elbow & bend on return valves (all of 1 inch size) MANOMETER: Transparent acrylic of 400mm PUMP: 0.5 hp standard make TANKS (SS) Sump Tank-72 liters capacity with over flow arrangement & butterfly valve PUMP STARTING Standard make starter with indicator PRESSURE TAPPING VALVES: 20nos, ¼ ball valve standard make CONTROLLING VALVES: 1no 1 wheel valve standard make SUPPLY: 1 ph, 220 V, 6Amps to be provided by user. With Manual	**1**
5	Pipe Friction Apparatus Pump : Kirloskar 0.5 HP Mono block, G.I pipe: transparent acrylic mercury column, 550 mm U tube Piezometer: 400 mm long transparent acrylic with scale. Pump: 0.5hp, standard make. Tanks (S.S) arrangement & butterfly valve Pump starting: standard make starter with indicator Pressure tapping valves: 1nos 1 wheel valve standard make Supply: 1ph,220V 6amps to be provided by use All the above mounted on sturdy frame of M.S angle. With Manual	**1**
6	Calibration Test Rig for Venturimeter Pump: Kirloskr 0.5 HP Monoblock, 1phase. Sump tank: Min. 1000X300X400 Collecting tank: 300X300X400 MS with FRP coat Orifice meter: size: 25X 12.5mm Manometer: 200-0 200mm with mercury Piezometer: Valves for flow control. With Manual	**1**
7	Calibration Test Rig for Orifice Meter Pump: Kirloskr 0.5 HP Monoblock, 1ph. Sump tank: Min. 1000X300X400 Collecting tank: 300X300X400 MS with FRP coat Orifice meter: size: 25X 12.5mm Manometer: 200-0 200mm with mercury Piezometer: Valves for flow control. With Manual	**1**
8	Bernoulls Apparatus **Specification:** Venturi meter: 25mm inlet & 1.5 mm throat (transparent acrylic) Monoblock Kirloskr pump: standard make, 0.5HP Piezometer: 1no, 250long transparent acrycle multi bank mano meter: 1 no. 10 points, transparent acrylic Tanks, sump tank 50lts capacity feed tank 15 Its capacity, 2 in nos. Delivery tank-15 Its capacity Kirloskr pump starting standard make starter with indicator Supply: Iph,220V,15 Amps All this are mounted on sturdy frame of MS angle and M.S square Tube**.** With Manual	**1**
9	Reynolds Apparatus for Demonstration of stream lined and Turbulent flow. With Manual	**1**
10	Calibration Test Rig for Rotometer. With Manual	**1**
11	Pitot Tube Apparatus. With Manual	**1**

HYDRAULIC MACHINERY LAB

Sl.No.	Item	Qty
1	Multistage certificate pump 1 HP: test rig : Motor 1HP 3phase 1440 rpm Make Kirloskar PUMP 1hp,standard make MOTOR (AC) 1hp standard make, 1 speed PIEZOMETER Transparent acrylic of 450mm long with scale TANKS (SS): Sump tank-112 liters capacity Measuring tank -49 liters capacity with over flow arrangement & butterfly valve STARTER: Standard make and red indicator INPUT POWER MEASURMENT: By energy meter, standard make Digital Speed Indicator: with proximity sensor for rpm measurement PRESURE GAUGE: 1 no., 0-2 kg/cm2 VACUUM GAUGE: 1NO., 0-760mm of hg PIPE line 1"inc GI SUPPLY 1ph 220 v,6 amps.	**1**
2	Reciprocating Pump test rig 1 HP Kirloskar: sump tank 1000X100X400, Collecting tank 300X400X300, MS with FRP coat Piezometer A graduated glass tube: Pressure guage: 0-4 kg/cm2 Vacuum gauge: 0-766mm of Hg valves: for flow input power measurement energy meter (5-10A,3ph)	**1**
3	Gear pump Kirloskar test rig 1 HP With oil: M.S Measuring tank of 0.3X0.3X0.4m M.S sump of 0.3X0.3X0.4m c Powder coated Rigid M.S Frame. 0.5 HP capacity pump set measurement of power input experiments for different discharges.	**1**
4	Jet pump 1 HP test rig:	**1**
5	Submersible Pump test rig 1 HP: Kirloskar make, Pump: A Monoblock submersible 1 hp to discharge about 75 1pm Against as delivery head of 15m Electrical panel: suitable control panel with necessary switches & accessories. Measuring Tank: S.S tank with required coating for rust protection with control valve. Piezometer with scale and an overflow arrangement Sump Tank: S.S tank with required coating for rust protection for storage of water to circulate through experimental unit. OTHER: Piping system consisting of pipes, valves and fitting pressure & flow measurement unit	**1**
6	Pelton Turbine Test rig with 5 HP centrifugal Pump: Pump Kirloskar make 5 HP, With mechanical loading 1kw (1.3HP capacity) with suitable pump model: FM30 OR EQUAVALENT Sump tank Material:800X800X600 mm SS304 or MS with FRP coat Discharge measurement: venture meter or orifice meter LOAD: Mechanical Rope Brake/ Electrical generator with load bank Pressure gauge: 0-4kg/cm2,0-7kg/cm2 reputed make gauges Speed measurement: Digital RPM Indicator with Proximity sensor Experiment capability: input & output power, Efficiency of the turbine with graphs Manual: Self explanatory instruction manual with sample calculation.	**1**
7	Francis Turbine Test rig with 5 HP mixed flow pump Kirloskar: 1Kw output.	**1**
8	Kaplan Turbine test rig with HP mixed flow pump: 1Kw output.	**1**
9	Impact of jet on vanes apparatus: Pump Kirloskr 0.5 HP Monoblock, 1phNozzle: brass with dia of 4mm, 6mm &8mm MODELS: Transparent acrylic of flat hemi spherical and inclined 600 shape PUMP: 0.5 hp standard make TANKS (SS) sump tank -49 liters capacity JET CHAMBERS (SS) Transparent acrylic windows 350mm * 350mm square FORCE MECHANISM By load cell @ digital indicator RoTAMETER: Water flow measurement, 0-30 LPM PUMP STARTING: Standard make starter with indicator CONTROLLING VALVES: 1no., 1 wheel valve standard make SUPPLY: 1ph,220v amps.	**1**
10	Hydraulic Ram Test rig:	**1**
11	Model of pump & Turbine impellers:	**1**

HEAT TRANSFER LAB

Sl.No.	Item	Qty
1	**Thermal Conductivity of Insulating Powder.** Equipment should consist of Heater of 500 W, Heater power control, Power easurement, T temperature measurement, 08 to 10 Thermocouples, Digital mperature indicator range of 0 to 200.	1

2	**Heat Transfer from vertical tube by Natural Convection.** Equipment should consist of Heater of 250 W, Heater power control, Power Measurement, Temperature measurement, 08 to 10 Thermocouples, Digital temperature indicator range of 0 to 200 ^{0}C, Electronic Dimmer, voltage current measurement devices, Vertical Tube. etc.,	1
3	**Heat Transfer through pin fin by natural and forced convection.** Equipment should consist of Heater of 350 W, Heater power control, Power Measurement, Air flow measurement (orifice U tube Manometer and flow control valves), Pin Fins of Brass Aluminium Copper rods of 12 mm Dia and 150 Length., Temperature measurement,08 to 10 Thermocouples, Digital temperature indicator range of 0 to200 ^{0}C etc.,	1
4	**Heat Transfer through composite walls.** Equipment should consist of Heater of 500 W, Heater power control, Power Measurement, Temperature measurement,08 to 10 Thermocouples, Digital temperature indicator range of 0 to 200 ^{0}C, Electronic Dimmer, voltage current measurement devices. Chamber made of wood. Composite plates etc.,	1
5	**Emissivity of test plate.** Equipment should consist of Heater of 250 W, Heater power control, Power Measurement, Temperature measurement,08 to 10 Thermocouples, Digital temperature indicator range of 0 to 200 ^{0}C, Electronic Dimmer, voltage current measurement devices. Chamber made of wood. Composite plates etc.,	1
6	**Heat Transfer through metal rod.** Equipment should consist of Heater of 250 W, Heater power control, Power Measurement, Temperature measurement,08 to 10 Thermocouples, Digital temperature indicator range of 0 to 200 ^{0}C, Electronic Dimmer, voltage current measurement devices. etc.,	1
7	**Parallel and counter flow heat exchangers.** Equipment should consist of Heater of 250 W, Heater power control, Power Measurement, Temperature measurement, 08 to 10 Thermocouples, Digital temperature indicator. Electronic Dimmer, voltage current measurement devices. Cold water and Hot water flow pipes. Water flow measurement, measuring jar etc.	1
8	**Heat transfer through heat pipe.** Equipment should consist of Heater of 250 W, Heater power control, Power Measurement, Temperature measurement,08 to 10 Thermocouples, Digital temperature indicator ,Electronic Dimmer, voltage current measurement devices. Pipe, etc.,	1
9	**Estimation of Stefan Boltzmann's constant.** Equipment should consist of Hot water sources ISI make, Temperature measurement multi point digital temperature indicators, Time measurement, 08 to 10 Thermocouples	1
10	**Calibration of thermocouple.**	1

B. ELECTRONICS & COMMUNICATION ENGINEERING

Sl. No.	Name of the component	Required Quantity	Quote your Rate only for one Item
1	Anshuman Microprocessor Kits (8086) including interfacing Kits (ADC,DAC stepper motor LED LCD Traffic light controller)	15	01
2	8051 microcontroller kits including interfacing kits	10	01

Sl. No.	Name of the component	Required Quantity	Quote your Rate only for one Item
1	Xilinx ISE design tools	5	01
2	MATLAB R2014 4a	5	01

Exixting Components in MWE lab:-

Sl. No.	Name of the component	Required Quantity	Quote your Rate only for one Item
1	Reflex Klyston bench set up	1	01
2	Circulators	1	01
3	Magic tee	1	01

Sl. No.	Name of the component	Required Quantity	Quote your Rate only for one Item
1	Reflex Klystron bench set up	04	01
2	Gunn diode bench set up	04	01
3	Circulators	04	01
4	Directional couplers	04	01
5	Magic tee	04	01
6	Serial data link & modem	01	01
7	Optical source detector and fiber characteristics	02	01
8	E plane tee	02	01
9	H plane tee	02	01
10	Standard gain horn antenna	02	01
11	Fixed attenuator (3dB and 6dB)	02	01
12	Isolator	02	01
13	SS tuner	02	01
14	Bends (E&H type)	02	01
15	Parabolic antennas	02	01
16	Phase shifters	02	01
17	Dialectic material	01	01

Sl. No.	Name of the component	Required Quantity	Quote your Rate only for one Item
1	Regular power supply	6	01
2	Function Generator	10	01
3	Ammeters	10	01
		5	01

Sl. No.	Name of the component	Required Quantity	Quote your Rate only for one Item
1	Amplitude modulation & Demodulation Kits	03	01
2	Frequency modulation & Demodulation kits	03	01
3	Balance modulation kits	02	01
4	Pulse modulation kit (PAM,PPM,PWM)	03	01
5	Sampling theorem verification kits (Natural sampling Flat top sampling)	03	01
6	Digital carrier modulation kits (ASK,BFSK,BPSK,DPSK,QPSK)	03	01
7	Digital storage oscilloscope (color)	02	01
8	Spectrum Analyzer	01	01
9	Pulse code modulation kit with Tx and Rx	02	01
10	Delta modulation kits	02	01
11	Channel TDM using pulse amplitude modulation and demodulation.	02	01

6. **Warranty**
   Minimum of 3 years warranty including spares and parts should be provided for complete system.
7. **Training**
   3 days extensive hands on training to operators at free of cost.
8. **Power supply:** Indian Standard
   Single Phase = ~230 V/50 Hz
   Three Phase = 440 V/220 /50 Hz

II. Pre-requisites for installation of system to be quoted separately in INR.

1. 5 KVA online UPS with 4 hrs back-up
2. Standards for calibration

Note: Prices should be quoted for CIP – Warangal/Hyderabad Airport, India

2. Technical Specification for Potentiostat set-up with accessories

Warranty
Minimum of 3 years warranty including spares and parts should be provided for complete system.

Power supply: Indian Standard
Single Phase = ~230 V/50 Hz
Three Phase = 440 V/220 /50 Hz

Note: Prices should be quoted for CIP – Warangal / Hyderabad Airport, India