

Tender Documents for the Supply of

1. **Electrical and Electronics Engineering Lab Equipments**
2. **Mechanical Engineering Lab Equipments**
3. **Civil Engineering Lab Equipments**
4. **Electronics & Communication Engineering Lab Equipments**

To
KU College of Engineering & Technology



Kakatiya University
GundlaSingaram, Hanamkonda
Dist:Warangal - 506 009,Telangana State



KAKATIYA UNIVERSITY

Warangal - 506 009, Telangana

No. 1166/KUCE&T/2017

Dated: 16-09-2017

SHORT 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 23-09-2017.

PRINCIPAL

Tender Summary

Tender Number	1166/KUCE&T/2017 Dated: 16- 09-2017
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	23.09.2017
Bid Outer Cover opening	23.09.2017 (after 5.00 PM)
Bid opening (Technical)	Will be decided on the day of opening.

PRINCIPAL

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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 **Mechanical Engineering, Civil Engineering, Electronics & Communication Engineering and Electrical and Electronics Engineering** to Kakatiya University College of Engineering & Technology, GundlaSingaram, 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, GundlaSingaram, 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	23.09.2017
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, GundlaSingaram 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 nonreceipt/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, 23.09.2017”** should 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 tenderer's 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, GundlaSingaram, 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, GundlaSingaram, 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 its 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 equipments

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 equipments 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 Sincerely,

(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 _____
Name _____
Designation _____
Address _____

Signature _____
Name _____
Designation _____
Address _____

Company _____
Date _____

Company _____
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

Signature

Place

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

Signature

Place

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

Signature

Place

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) Electrical and Electronics Lab Equipments

(1) Control Systems Engineering (2) Digital Simulation Lab (3) Electrical Machines

(4) Electronics and Drives (5) Power Systems

(1) Control Systems Engineering

S. No.	Item	Specifications	Quantity
1.	Second Order system study unit	--	01
2.	Lead-lag network study unit	In built signal source Necessary active components to build lead, lag circuits Built in power supply	01
3.	PID controller trainer	In built lead-lag network	01
4.	Synchro Transmitter Receiver pair	--	01
5.	Closed loop speed control of 3-phase Induction motor (2 HP, 415 V)	3-phase induction motor arrangement with tacho-generator In built power supply Necessary interface devices Necessary meters	01
6.	Closed loop speed control of DC motor (2 HP, 415 V)	DC motor arrangement with tacho-generator DC motor: 12 V DC, 1.1 A, 1500 RPM In built power supply Necessary interface devices Necessary meters	01
7.	Speed Torque characteristics of DC servo motor	In built power supply Necessary interface devices Necessary meters	01
8.	Speed Torque characteristics of AC servo motor	In built power supply Necessary interface devices Necessary meters	01
9.	Compensation Design	--	01
10.	PID controller	--	01
11.	Linear System Simulator	First order and second order system simulator Built in signal source (Square & Triangular wave) Variable gain amplifier Uncommitted amplifier for phase measurement	01
12.	Stepper motor controller with 8085 microprocessor	--	01
13.	DC motor position control system	--	01
14.	Analog PID controller	--	01
15.	ON/OFF Temperature Controller	--	01
16.	Digital Multimeters Model No: VC-97 3¾ DMM	DC Voltage: 400 mV-1000V (± 0.5 %) AC Voltage: 400 mV-750V (± 0.5 %) DC Current: 400 μ A-10A (± 1 %) AC Current: 400 μ A-10A (± 1 %) Resistance: 400 Ω -40 M Ω (± 1 %) Capacitance: 4 nF - 200 μ F (± 2.5 %) Frequency: 100 Hz-30 MHz (± 0.5 %) Input Impedence : 10 M Ω Sampling Rate: 3 times /second AC Frequency response: 40- 400 MHz	15

(2) Digital Simulation Lab

S. No.	Name of the Equipment/Software	Quantity
1.	PSIM	5 Users
2.	MAT LAB	10 Users
3.	PS CAD	5 Users
4.	MI POWER	5 Users

(3) Electrical Machines

S. No.	Item	Specifications	Quantity
1.	1- Φ Autotransformer (Variac)	Phase: Single (1- Φ) Input: 230V Output: 0-270V Frequency: 50 Hz	08
2.	1- Φ Transformer	Phase: Single(1- Φ), Capacity: 3 kVA Input: 0-200-246-400 with taps (Primary) Output: 230V (Secondary) Frequency: 50 Hz	03
		Phase: Single(1- Φ), Capacity: 2 kVA Input: 0-115-200-230 with taps (Primary) Output: 230V (Secondary) Frequency: 50 Hz	03
		Phase: Single(1- Φ), Capacity: 1 kVA Input: 0-100-200-230 with taps (Primary) Output: 230V (Secondary) Frequency: 50 Hz	03
3.	3- Φ Autotransformer (Variac)	Phase: Three (3- Φ) Input: 415V Output: 0-470V Frequency: 50 Hz	06
4.	DC Series Motor (with 2-point starter) With loading arrangements	Voltage: 220 V, 12 A Power: 3 Hp With current $I_A=12A$ RPM: 1500 Type: Series 2-point starter: 1 No.	To conduct load test 01
5.	DC Shunt Motor Generator set (with 3-point starter)	Voltage: 220 V, 10A Power: 5 Hp With current $I_A=10A$, $I_F=0.6A$ at 220V RPM: 1500 Type: Shunt 3-point starter: 1 No.	To determine characteristics To conduct load test 02
6.	DC Compound Motor Generator set (with 3-point starter)	Voltage: 220 V, 10A Power: 3 Hp With current $I_A=10A$, $I_F=0.6A$ at 220V RPM: 1500 Type: Shunt 3-point starter: 1 No.	To determine characteristics To conduct load test 02
7.	DC Shunt Motor coupled with 3-phase Synchronous Generator set (with 3-point starter and exciter unit)	Motor: Voltage: 220 V, 20 A Power: 5 Hp With current $I_A=20A$, $I_F=0.8A$ at 220V RPM: 1500 Type: Shunt	To determine voltage regulation by various methods To conduct parallel operation 05

		3-point starter: 1 No.		
		Generator: Voltage: 415V, 5A Power: 3 kVA With current $I_A=5$ A, $I_F=1.4$ A at 220V RPM: 1500, star connected 0.8 pf		
8.	3-phase slip ring induction motor with loading arrangement	Voltage: 415 V, 10 A Power: 5 Hp RPM: 1440, delta connected	To conduct load test	01
9.	3-phase squirrel cage induction motor with loading arrangement	Voltage: 415 V, 10 A Power: 5 Hp RPM: 1440, delta connected	To conduct load test To conduct no-load and blocked rotor test	02
10.	3-phase Synchronous motor with loading arrangement with exciter unit	Voltage: 415V, 5A Power: 3 kVA With current $I_A=5$ A, $I_F=1.4$ A at 220V RPM: 1500, star connected 0.8 pf	To conduct load test To determine V and inverted V curves	02
11.	Single phase capacitor start -run induction motor with loading arrangement	Voltage: 230 V, 10A Power: 3 Hp RPM: 1500	To conduct load test	01
12.	Three phase Induction motor with pole changing arrangement	Voltage: 415 V, 10 A Power: 5 Hp RPM: 1440, delta connected	To conduct speed control	01
13.	Single phase Induction motor with loading arrangement	Voltage: 230 V, 10A Power: 3 Hp RPM: 1500	To conduct speed control	01
14.	Scott connected Transformer	Phase: Three (3- Φ) Input: 415V Output: 0-234V Frequency: 50 Hz Capacity: 3 kVA		01
15.	Rheostats	Rating: 185 Ω / 1.1 A 350 Ω / 1.1 A 100 Ω / 3 A 26 Ω / 4.1 A		05 05 03 02
16.	Voltmeters (Moving Coil type-DC)	Housed in Bakelite case with knife edge pointer & anti parallax mirror scale of 140 mm. Accuracy as per ISS 1248/83 Range: 0-30V, Moving coil Type; Make: MECO Range: 0-300V, Moving coil Type; Make: MECO		03 06
17.	Voltmeters (Moving Iron type-AC)	Housed in Bakelite case with knife edge pointer & anti parallax mirror scale of 140 mm. Accuracy as per ISS 1248/83 Range: 0-300/600V , Moving Iron Type; Make: MECO Range: 0-150/300/600V , Moving Iron Type; Make: MECO		04 04

18.	Ammeters (Moving Coil type-DC)	Housed in Bakelite case with knife edge pointer & anti parallax mirror scale of 140 mm. Accuracy as per ISS 1248/83 Range: 0-2A, Moving Coil Type; Make: MECO Range: 0-3A, Moving Coil Type; Make: MECO Range: 0-15A, Moving Coil Type; Make: MECO	03 04 02
19.	Ammeters (Moving Iron type-AC)	Housed in Bakelite case with knife edge pointer & anti parallax mirror scale of 140 mm. Accuracy as per ISS 1248/83 Range: 0-5A-10A, Moving Iron Type; Make: MECO Range: 0-10/20 A, Moving Iron Type; Make: MECO Range: 0- 15A, Moving Iron Type; Make: MECO Range: 0-30 A, Moving Iron Type; Make: MECO	02 02 02 02
20.	Wattmeters	Housed in Bakelite case with knife edge pointer & anti parallax mirror scale of 140 mm. Accuracy as per ISS 1248/83 Range: 150/300/600 V, 2.5/5 A, LPF; Make: MECO Range: 75/150/300 V, 5/10 A, UPF; Make: MECO Range: 150/300/600 V, 5/10 A, UPF; Make: MECO Range: 150/300/600 V, 10/20 A, UPF; Make: MECO Range: 150/300/600 V, 10/20 A, LPF; with reversible switch; Make: MECO	02 02 02 02 02
21.	Resistive Load Bank (1- Φ)	5 kW,15/20 A Should consists of 10 resistive loads each 0.5 kW; Make: STEAD	02
22.	Tachometer	Range: 0-10000 RPM, contact type (Analog) ; Make: MECO Range: 0-10000 RPM, non contact type (Digital) ; Make: MECO	02 10
23.	Digital Multimeters 3 $\frac{3}{4}$ DMM	DC Voltage: 400 mV-1000V (± 0.5 %) AC Voltage: 400 mV-750V (± 0.5 %) DC Current: 400 μ A-10A (± 1 %) AC Current: 400 μ A-10A (± 1 %) Resistance: 400 Ω -40 M Ω (± 1 %) Capacitance: 4 nF - 200 μ F (± 2.5 %) Frequency: 100 Hz-30 MHz (± 0.5 %) Input Impedence : 10 M Ω Sampling Rate: 3 times /second AC Frequency response: 40- 400 MHz	05

(4) Electronics and Drives

S. No.	Name Of the Equipment	Quantity
1.	Study of static characteristics of a SCR, MOSFET, IGBT, DIAC, TRAAC	01
2.	Full wave rectifiers with R & RL loads.	01
3.	1 - Φ phase voltage controllers for R & RL loads	01
4.	Study of forced commutation techniques of SCR	01
5.	SCR Circuit for DC motor control	01
6.	Chopper circuit	01

7.	Characteristics of DC servo motor	01
8.	Characteristics of AC servo motor	01
9.	UJT relaxation oscillator	01

(5) Power Systems

S. No.	Name of the Equipment	Quantity
1.	Analysis of normal π & T transmission line	1
2.	1 - Φ transformers - 2KVA 230/230V	3
3.	3 - Φ 2 winding & 3 winding transformer	1
4.	Reactive power control by tap changing transformers	1
5.	1 - Φ variac	6
6.	3 - Φ variac	3
7.	1 - Φ Resistive load	1
8.	3 - Φ Resistive load	1

B. Mechanical Engineering Labs

- (1) Metal Cutting Science Lab, (2) Refrigeration and Air Conditioning Lab
 (3) CAD/CAM Lab (4) Mechatronics Lab (5) Measurements and Metrology Lab
 (6) IC Engines Lab (7) Material Science and Testing Lab

(1) Metal Cutting Science Lab

S. No.	Item	Specifications	Quantity
1.	All Geared Lathe	UNITECH ALL GEARED LATHE WITH STANDARD Accessories:- Face Plate Follow Rest Machine Lamp 200MX 4JAW True Chuck 165MM x 3Jaw True Chuck Steady Rest Breaking System	2
2.	Radial Drilling Machine	Nikkee radial drilling m/c with standard accessories	1
3.	Horizontal Milling Machine	Accessories:- Vertical Attachment Dividing Head Rotary Table 6 Vice	1
4.	Vertical Milling Machine	Milling M/c With Standard	1
5.	Slotter Machine kirlosker	Slater Machine with Standard	1
6.	Shaper Machine kirlosker	Shaping with Standard Accessories size 12" Simple	1

7.	Single point tool grinder	With standard accessories	1
8.	Planner Machine	With standard accessories	1
9.	Lathe too Dynamometer	With standard accessories	2
10.	Work Tool Thermocouple	With standard accessories	2
11.	Bench Vices & C-Clamps	With standard accessories	12
12.	Tool Grander	With standard accessories	01
13.	Cylindrical Grander	With standard accessories	01
14.	Lathee Cone Pulley	Master 4 ½ Lathe with standard Accessories:- 1HP /3PH Electric Motor 160mm True Chuck Chuck Palte 200MM 4 Jaw Dog Chuck Chuck Plate Taperr Turning Attachment	3

(2) Refrigeration and Air Conditioning Lab

S. No.	Item	Specifications	Quantity
1.	COP of VCRS System	<p>With Kirloskar^{1/3} HP Sealed Compressor 2/2 dial Fiebig Make Compound gauge and pressure gauge Thermocouple condenser evaporator Expansion Device Compressor: Hermetically Sealed, Capacity ¼ Ton, 230 V AC.</p> <ul style="list-style-type: none"> • Condenser: Finned Copper Tube Condenser with condenser fan & motor • Evaporator: Coiled Evaporator immersed in Water • Expansion Device: Capillary Tube • Flowmeter: Glass Tube Rotameter for Refrigerant Flow • Pressure gauge: 0 to 300 PSI • Compound gauge: -30 to 150 PSI • Water Circulating Pump • Electric Heater: Capacity 1 kW, Supply 230 V AC • Dimmer: Range 0-250 V AC, 4 A • Digital Voltmeter: Range 0-500 V AC • Digital Ammeter: Range 0-5 A AC • Temperature Sensors: Pt 100 temperature sensors – 5 Nos. • Temperature Indicator: 8 Channel Indicator with Selector Switch, Range 0-199.9 °C • Frame: Made of M.S. Square Tubes & Sheets, Welded & Powder coated. 	1

2.	Calculation of Psychometric ppty variations in diff.process	With standard accessories	1
3.	Bypass factor of cooling coil	With standard accessories	1
4.	Vertex tube Refrigeration system	With standard accessories	1
5.	Performance of VAR system	Domestic Vapor Absorption System: Packaged refrigerator working on Vapor Absorption Cycle. Refrigerator includes Electrically Heated Generator, Absorber, Condenser, Evaporator, insulated cabinet. Capacity 41 Ltrs. Cooling Capacity 50 Watt Approx., Power consumption 60 - 70 Watt <ul style="list-style-type: none"> • Energy meter: Digital Indicator • Temperature Sensors: PT 100 temperature sensors - 6 Nos. • Temperature Indicator: 6 Channel Indicator with Selector Switch, Range 0-199.9 °C • Frame: Made of M.S. Square Tubes & Sheets, Welded & Powder coated. 	1
6.	Performance testing of window AC	0.75tons with with standard accessories	1
7.	Psychometric process of evaporative cooling	With standard accessories	1

(3) CAD/CAM Lab

S. No.	Item	Specifications	Quantity
1.	CNC Lathe Machine (with Simulation)	With standard accessories	1
2.	CNC milling machine (with simulation)	With standard accessories	1

(4) Mechatronics Lab

S. No.	Item	Specifications	Quantity
1.	Microcontroller with server along with the kit	Includes inductive switches, proximity sensors, Capacitive sensors, pneumatic cylinders - single and double Air Compressor With manuals, Wall boards	1
2.	Simulation software (Pneumatic & Hydraulic power systems)		1
3.	Simulation software trainer systems		5

(5) Measurements and Metrology Lab

SI No:	Name of Equipment	Company	Quantity
1	Surface plate (24*24)	Mitutoyo/ Baker	02
2	Screw thread Micrometer set (with V-Anvils) with sample	Mitutoyo/ Baker	01
3	3-wire set guage	Mitutoyo/ Baker	01
4	Pitch guage set	Mitutoyo/ Baker	01
5	Micrometer (25-50 mm Analog)	Mitutoyo/ Baker	01
6	Micrometer (0-25mm Analog) + Samples (20) for Statistical Quality control	Mitutoyo/ Baker	01
7	Gear Tooth Calipers	Mitutoyo/ Baker	01
8	Magnetic stands for dial gauge		02
9	V-blocks		02
10	Pneumatic dial Comparator		1
11	Spirit Level		3
12	Surface Roughness tester	Mitutoyo Portable surface Roughness Teaster: Talysurf. With all attachments, including optional attachments & Manual	1

(6) IC Engines Lab

S. No.	Item	Specifications	Quantity
1.	2 stroke single cylinder petrol engine (variable speed)	AC Generator 2 KW with 1500 rpm, Cooling air tank 0.5x0.5x0.5 m	1
2.	Single cylinder 4 stroke petrol engine test a) With rope brake dynamometer b) With electric dynamometer	3HP at 3000 rpm with accelerator control AC 3KW 1500 rpm Cooling air tank 0.5x0.5x0.5 m	1
3.	Morse test: 4 stroke, 4 Cylinder engine a) With eddy current load with hydraulic dynamometer b) With	Water cooled, Variable speed petrol engine (ISUZU)	1

	mechanical brake drum load with hydraulic dynamometer		
4.	retardation test	Field Marshal 6HP, 650 rpm, single cylinder, water cooled 4 stroke diesel engine with mechanical brake drum	1
5.	Performance heat balance test	Field Marshal 10HP, 1500 rpm, twin cylinder, vertical water cooled 4 stroke diesel engine with exhaust gas calorimeter	1
6.	5 HP diesel engine test with a) With rope brake dynamometer b) With electric dynamometer	With standard accessories	1
7	Mini steam generator with separating and throttling calorimeter	With standard accessories	1
8	2 stage air compressor test rig	Air cooled inter cooler, pressure of 10 kg/cm ² , displacement of 0.5 m ³ per minute, Kirloskar Motor, 5HP V-Belt, 400/440 volts, 3phase, 50 Cycles AC supply, 3 phase With standard accessories	1

(7) Material Science and Testing Lab

S. No.	Item	Specifications	Quantity
1.	UTM software System with Printer	Model UTE 40 & FIE	1
2.	Image Analyzer (Microstrucure)	With standard accessories	1
3.	Brinell Hardness Test Machine	With standard accessories	1
4.	Rockwell Hardness Test	With standard accessories	1
5.	Grain Fineness Number for for green sand test	Sieves (BSS Standard)	1

C. Civil Engineering Labs

(1) Concrete Technology Lab (2) Engineering Geology Lab (3) Geo Technical Engineering Lab (4) Transportation Engineering Lab

(1) Concrete Technology Lab

S. No.	NAME OF THE MAJOR EQUIPMENT/MACHINERY	QUANTITY REQUIRED
1.	PIN vibrator	1
2.	Hydraulic Jack 1000kN capacity with gauge and hand pump	2
3.	Accelerated for 12/24 moulds of 150mm/70.6mm size	1
4.	Integral type compression Proving ring (1000kN)	1
5.	Loading Frame 100T capacity with hydraulic Jack	1
6.	Load cell 100T capacity	1
7.	Data Acquisition system for strain(50 channel)	1
8.	Proving ring 100 T capacity	1
9.	Compression testing machine3000kN (300T), (200 T)	2
10.	Vicat needle apparatus	3
11.	Slump test Apparatus	2
12.	Compaction factor operators	1
13.	Needle vibrator 1" diameter (Engine Driven)	1
14.	Briquette Testing machine (hand operated)	1
15.	Weighing balance 100Kg.	1
16.	Barranger Balance 5kg 10kg with weights	3
17.	Blains Permeability apparatus	1
18.	Vibrating machine electrical HC 42.135	1
19.	Flow table (250mm diameter)	1
20.	Vibrating table apparatus(Variable speedpulley)	1
21.	Specific gravity bottles	4
22.	VEE-BEE Consistometer HC 37.65	1
23.	Concrete Mixer of ¼ bag cement capacity	1
24.	Compressometer	1
25.	Concrete Test Hammer	1
26.	Electronic Weighing machine (10kg, 20 kg, 150 kg capacity)	3
27.	Hot Air oven 6'x2'x2'	1
28.	Concrete Core Drilling Machine(Diesel)	1

(2) Engineering Geology Lab

S. No.	NAME OF THE MAJOR EQUIPMENT/MACHINERY	QUANTITY REQUIRED
1.	Set of Minerals showing Fracture	1
2.	Set of Minerals showing Cleavage	1
3.	Set of Minerals showing Crystalline	1
4.	Set of Rocks and Minerals showing Crystals	1
5.	Collection of Ore Minerals	1
6.	Set of Crystal aggregate	1

7.	Set of Minerals showing Magnetism and Electricity	1
8.	Set of Minerals showing Structures&Tenacity	2
9.	Fault Models, Model No.s 20 to 23 Type B, 24 to 30 Type A&B 31 & 32	13
10.	Fold Models No.s11 & 12 type A&5 - 10 Type B	8
11.	Model No.s 13 & 14 (B), 15-17 (A), 18 & 19 (B), No.s3 and 4 Type B	9
12.	Model of Different Forms of Igneous Rock Bodies	1
13.	Model of Inlier, Outlier River Terraces Model nos.	3
14.	Set of Minerals showing Odour collection	1
15.	Set of 100 Minerals showing Micro-sections	1
16.	Set of 100 Wooden Crystal Models	1
17.	10 Blocks Unpolished Stones of Sizes 10 cmx 10 cm	1
18.	10 Nos. Specimen showing Different mineralsType	1
19.	25 Nos. Stones Polished on one side	1
20.	25 Transparent Plastic Sheet Crystal Models	1
21.	Set of 6 models of Axes	1
22.	Wooden Models Demonstrating Elements	1
23.	Set of 9 minerals hardness collection inclusive	1
24.	Specimens Exhibiting Different Habit and Structure	1
25.	Transparency & Double Refraction Collection	1
26.	Hardness collection set of 9 minerals	10

(3) Geo Technical Engineering Lab

S.No.	NAME OF THE MAJOR EQUIPMENT/MACHINERY
1.	MotorizedLiquid Limit Device with Counter and Grooving Tools
2.	Liquid Limit Device with Counter and Grooving Tools
3.	Consolidation Apparatus with Dial gauge
4.	Three Gang Consolidometer
5.	Proctor penetrometer Hydraulic
6.	Direct Shear Hand Operated
7.	Sieve Shaker Gyrotory with Timer
8.	Sieve Shaker hand operated
9.	Field Density Apparatus Core Cutter Method
10.	Sand Pouring Method
11.	Plate Load Test Apparatus 50 ton
12.	Hot Air Oven 450 mm x 450 mm x 450 mm Aluminum
13.	Load Frame 10 ton 8 Speed
14.	Proctor Compaction Apparatus Ramer &Mould
15.	Permeability Apparatus (variable)

16.	Constant head
17.	Triaxial Shear Test Apparatus with all Accessories
18.	Direct Shear Apparatus(Motorized)
19.	Electronic Balance
20.	SPT with all accessories
21.	Laboratory vane shear Apparatus Motorized
22.	Interface Friction Measurement Apparatus
23.	Grab Tensile strength Test Grip
24.	Hydraulic sample eject 500Motorized

(4) Transportation Engineering Lab

S. No.	NAME OF THE MAJOR EQUIPMENT/MACHINERY
1.	Aggregate Crushing Value Apparatus with Accessories
2.	Aggregate Impact Apparatus with Accessories
3.	CBR Compaction Apparatus Motorised CBR Compaction
4.	CBR Field Test Apparatus (Field Type)
5.	Crushing Testing Machine,100 tones
6.	Deval Attrition Testing Machine
7.	Digital Weighing Machine
8.	Dorry Abrasion Testing Machine
9.	Ductility Testing Machine
10.	Los Angles Abrasion Testing Machine
11.	Marshal Stability Test Apparatus
12.	Marshal Stability Test Collar Extension
13.	Standard Penetrometer without needle and Thermometer

D. Electronics and Communication Engineering

(1) Analog & Digital Communication System, Digital Electronics lab, Electronics and Device Circuits

Sl. No.	Item
1.	Amplitude Modulation and Demodulation kit
2.	Frequency Modulation and Demodulation Kit
3.	Balanced Modulation Kit
4.	Pulse Modulation Kit (PAM,PPM,PWM) & Demodulation kits
5.	Sampling Theorem Verification Kit (Natural Sampling , Flat Top Sampling)
6.	Digital Carrier Modulation Kit (ASK,BFSK,DPSK,QPSK)
7.	Pulse Code Modulation & De-Modulation, PCM Tx and Rx
8.	Delta modulation and demodulation, linear, CSVD
9.	Channel TDM Using Pulse Amplitude Modulation And Demodulation
10.	Cathode Ray Oscilloscope
11.	Function Generator
12.	Dual Power Supply
13.	Fixed Power Supply
14.	Digital Electronics kits

(2) Electrical Measurements Lab

S. No.	Name of the Equipment
1.	Kelvin's Double Bridge
2.	Schering Bridge
3.	Maxwell's Bridge
4.	Hay's bridge
5.	Potential transformer
6.	Current transformer
7.	Cathode ray oscilloscopes
8.	Rheostat- 1000 Ω /1.4 Amps

E. Projector Specification

1) Projector Spec 1

Item Code	Make & Model
Model	PJD5155
Model Name	LightStream
Item Weight	2.1 Kg
Product Dimensions	22.8 x 31.6 x 10.4 cm
Item model number	PJD5155
Resolution	800 x 600
Optical Zoom	1.1 X
Digital Zoom	2 X
Horizontal Resolution	800 Pixels
Max Vertical Resolution	600 Pixels
Noise Level	31 dB
Audio Wattage	265 Watts
Wattage	265 Watts
Power Source	AC
Speaker Output Channel Quantity	1 or more
Usb Ports	1 or more
VGA Port	1 or more
Batteries Included	No
Batteries Required	No

1) Projector Spec 2

Item Code	Make & Model
Model	VS345 WXGA 3LCD Projector
Model Year	2015
Item Weight	2.4 Kg
Product Dimensions	36.8 x 35.1 x 15.7 cm
Item model number	VS345 WXGA 3LCD Projector
Colour Screen	No
Noise Level	37 dB
Wattage	291 Watts
Batteries Included	No
Batteries Required	No
Speaker Output Channel Quantity	1
Usb Ports	2 or more
Contains Liquid Contents	No
Includes Rechargeable Battery	No
Includes Remote	Yes
Supports Bluetooth Technology	No
Speaker Output Channel Quantity	1
Total Usb Ports	2

I. Analog & Digital Communication System, Digital Electronics lab, Electronics and Device Circuits

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