Women Institute of Technology, Sudhowala, Dehardun,New Uttarakhand Technical Unvesity campus P.O. Sudhhowala Premnagar Dehardun

INVITATION LETTER

Package Code: TEQIP-III/2019/UK/wits/167 **Current Date: 28-Nov-2019**

Package Name: TEQIP/WIT/EE/004 **Method: Shopping Goods**

Sub: INVITATION LETTER FOR TEQIP/WIT/EE/004

Dear Sir,

1. You are invited to submit your most competitive quotation for the following goods with item wise detailed specifications given at Annexure I,

Sr. No	Item Name	Quantity	Place of Delivery	Installation Requirement (if any)
1	Upgradation of Power Electronics Lab	1	WIT DEHRADUN	

2. Government of India has received a credit from the International Development Association (IDA) towards the cost of the **Technical Education Quality Improvement Programme [TEQIP]-Phase III** Project and intends to apply part of the proceeds of this credit to eligible payments under the contract for which this invitation for quotations is issued.

3. **Quotation**

3.1 The contract shall be for the full quantity as described above.

3.2 Corrections, if any, shall be made by crossing out, initialling, dating and re writing.

3.3 All duties and other levies payable by the supplier under the contract shall be included in the unit Price.

3.4 Applicable taxes shall be quoted separately for all items.

3.5 The prices quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.

3.6 The Prices should be quoted in Indian Rupees only.

4. Each bidder shall submit only one quotation.

5. Quotation shall remain valid for a period not less than **90**days after the last date of quotation submission.

6. Evaluation of Quotations: The Purchaser will evaluate and compare the quotations determined to be Substantially responsive i.e. which

6.1 are properly signed; and

6.2 Confirm to the terms and conditions, and specifications.

7. The Quotations would be evaluated for all items together.

8. Award of contract The Purchaser will award the contract to the bidder whose quotation has been determined to be substantially responsive and who has offered the lowest evaluated quotation price.

8.1 Notwithstanding the above, the Purchaser reserves the right to accept or reject any quotations and to cancel the bidding process and reject all quotations at any time prior to the award of Contract.

8.2 The bidder whose bid is accepted will be notified of the award of contract by the Purchaser prior to expiration of the quotation validity period. The terms of the accepted offer shall be Incorporated in the purchase order.

9. Payment shall be made in Indian Rupees as follows:

Payment Description	**Expected Delivery Period (in Days)**	**Payment Percentage**
Satisfactory Delivery & Installation	30	10
Satisfactory Acceptance	30	90

10. Liquidated Damages will be applied as per the below:
Liquidated Damages Per Day Min %: N/A
Liquidated Damages Max %: N/A

11. All supplied items are under warranty of **N/A** months from the date of successful acceptance of items and AMC/Others is **.**

12. You are requested to provide your offer latest by **04:30** hours on **13-Dec-2019.**

13. Detailed specifications of the items are at Annexure I.

14. Training Clause (if any)

15. Testing/Installation Clause (if any)

16. Performance Security shall be applicable**: 0%**

17. Information brochures/ Product catalogue, if any must be accompanied with the quotation clearly indicating the model quoted for.

18. Sealed quotation to be submitted/ delivered at the address mentioned below, **Women Institute of Technology, Sudhowala, Dehardun,New Uttarakhand Technical Unvesity campus P.O. Sudhhowala Premnagar Dehardun**

19. We look forward to receiving your quotation and thank you for your interest in this project.

(Authorized Signatory)
Dr. Ashok Manori
Name & Designation

Annexure I

Technical Specification

1) Triggering circuit /dv/dt Protection Panel

- **SCR Triggering Schemes / turn ON methods.**
- Simple Resistance firing circuit for upto 90° SCR firing half wave.
- Resistance- Capacitor firing circuit with increased control SCR firing-half Wave & full wave.
- UJT/PUT based TRIAC Trigger with series/ shunt transistor controlled ramp, resistance controlled Pedestal
- TRIAC Triggering Schemes /turn ON methods.
- Simple Resistance firing circuit for TRIAC firing Full wave.
- UJT/PUT based TRIAC Trigger with series / shunt transistor controlled ramp, resistance controlled Pedestal
- dv/dt behavior of SCR
- Study of SCR dv/dt protection using gate termination.
- Study of SCR dv/dt protection using gate reverse bias with resistance.
- Study of SCR dv/dt protection using gate reverse bias with resistance and diode.
- Study of SCR dv/dt protection using gate using polarized snubber.
- Study of SCR dv/dt protection using polarized RC snubber with discharge resistor.
- Study of Triac dv/dt protection using RC Snubber.
  Each multi experiment panel is secured in an ABS molded plastic sturdy enclosure, and has colorful screw less overlay showing circuit & connection through Sturdy 4mm Banana Sockets & Patch Cards. Provided with 51 banana tags & 3TPs

2) SCR Application Panel

- Study of Zero Voltage Line switching & integral cycle control using SCR.
- Study of SCR based Ring Counter for sequential switching.
- AC voltage control using SCR based transformer tap changer.
- SCR based AC flasher / DC flasher.
- Each multi experiment panel is secured in a molded plastic sturdy enclosure, and has colorful screw less overlay showing circuit & connection through Sturdy 4mm Banana Sockets & Patch Cards. Provided with 26 banana tags

3) IGBT / MOSFET Inverter Panel

- Provided with uncommitted MOSFET (800V/7.8A, 2 No.)
  IGBT (600V/6.5A, 2 No.) brought out on Banana sockets, LM3525 based PWM converter to generate 200-2000Hz inverter frequency as well as duty cycle control, 1 No. optoisolated driver & 1 no. additional opto Drive provided on Topboard for Chopper etc.
- Switching characteristics of MOSFET / IGBT
- MOSFET / IGBT based 4 types of Chopper – Buck, Boost, Buch boost, Cuck.
- MOSFET / IGBT push pull and half bridge inverter 200/2000Hz.
- Each multi experiment panel is secured in a molded plastic sturdy enclosure, and has colorful screw less overlay showing circuit & connection through Sturdy 4mm Banana Sockets & Patch Cards. Provided with 46 banana tags.

4) Power Semiconductor application Exp. Panel

- Triac lamp dimmer, AC fan regulator, SCR operated light sensitive switch using LDR,SCR operated temperature sensitive switch using thermistor, UJT relaxation oscillator, Half and full wave (Phase shift controlled) rectifier using SCR, Timer using SCR & UJT, Built in Lamp load.
- Each multi experiment panel is secured in a molded plastic sturdy enclosure, and has colorful screw less overlay showing circuit & connection through Sturdy 4mm Banana Sockets & Patch Cards. Provided with 29 banana tags.

5) Power Semiconductor Application Experiment Panel

- SCR phase shift controlled converter using IC555 through opto isolator (Potentometric) (optoisolated),SCR AC power control using UJT/PUT (Potentometric), Triac AC power control using UJT/PUT (Potentometric), SCR/Traic temperature control using thermister, SCR/Triac intensity control using LDR,Opto isolated DC switch & photo relay & thermal relay (street light control).
- Each multi experiment panel is secured in a molded plastic sturdy enclosure, and has colorful screw less overlay showing circuit & connection through Sturdy 4mm Banana Sockets & Patch Cards. Provided with 16 banana tags

6) 3 PHASE HIGH VOLTAGE (HV) THYRISTOR CONTROL TRAINER

TECHNICAL SPECIFICATION

- Facilitates easy and safe wiring by students due to use of 4mm sturdy Shrouded banana patch cords and shrouded socket arrangements for high voltage circuits.
- Each panel has molded plastic sturdy enclosure, and colorful screwless overlays showing circuits diagrams & its connection tag numbers for easy understanding and connection.
- Set of Instructer Guide & Student workbook.
- Supplied with power scope attachment to any lab CRO for H V Differential voltage off-ground measurements.
- Input 3 phase DOL Starter panel
  [10 Shrouded Banana]
- 4 Pole MCB of 415V/4A.
- DOL 9A contactor with 230V/50Hz/11VA COIL.
- Bimetallic thermal O/L RELAY WITH RANGE 1.4A-2.3A.
- DC voltmeter and DC ammeter panel
  [6 Shrouded Banana]
- DC voltmeter (0-600V)
- DC Ammeter (0-5A) with polarity protection diode
- **Lamp Load** [12 Shrouded Banana]
- 230V/15/40/60/100WX3 bulbs with individual ON/OFF using 6A toggle switch.
- **Inductive (L) Load (15A)** [18 Shrouded Banana]
- Inductive load=0.75W/3H/300Max3Nos.
- 3 Ph. Bidirectional power cum Energy meter panel
  [8 Shrouded Banana]
- Bidirectional Multifunction
- 3 Phase ¾ wire, 415V CT Input 5A
- LCD/LED display, Aux. supply 230V,45-65 Hz, 5W
- V, I, Hz, pf,KVA,KW,KWh
- Modbus RTU RS 485(optinal)
- 6 SCR Firing/Synchronizing Panel
- [8 Shrouded Banana]
- Mode selection switches (3 nos) to select cyclo converter, converter or disable.
- Cosine firing scheme to facilate linear control for better harmonic ripple control.
- Cyclo converter frequency generator 25Hz/12.5Hz/6.25Hz
- Mode selection switched (3 Nos.) to select Cyclo converter frequencies, converter mode or disable.
- In built firing angle control pot.
- Facility to apply external 0 to 2.5V signal from DAC to control firing angle.

- 6 SCR Firing/Synchronizing Panel
  [36 Shrouded Banana]
- Consist of SCR [Body Anode Type] with PIV rating 1200V/25A.
- 6 Diode with PIV rating of 1200V/16Amp.
- 6 No. of uncommitted Snubbers for protection of thyristors consisting of capacitor 0.1µF/1000V & 100E/5W ceramic resistors.

List of Experiments

1) Working with 3 Phase HVDC:

a) 3 Ph. half wave uncontrolled Converter with Resistive load using diodes.
b) 3 Ph. full wave diode bridge (uncontrolled converter) with Resistive load.
c) Study of SCR firing circuits in 3-ph. converter environment.
d) 3 Ph. half / fully wave fully controlled / half controlled SCR converter with Resistive Load & motor load.

2) Working with 3 Phase AC Voltage Control:

a) Study of SCR firing circuits in 3 ph. AC voltage control.
b) 3 Ph. AC voltage controller with resistive load using SCRs.
c) 3 Ph. Induction motor speed control using SCR based AC voltage controller.
d) 3 Ph. AC voltage controller fed Induction motor Drive.

3) Working with 3 Ph. Cyclo-Converter:

a) Study of SCR firing circuits in 3 ph. Cyclo converter.
b) 3 ph. cycloconverter with resistive & motor load.

FORMAT FOR QUOTATION SUBMISSION
(In letterhead of the supplier with seal)

Date: _____

To:_____
_____

Sl. No.	Description of goods \ (with full Specifications)	Qty.	Unit	Quoted Unit rate in Rs. (Including Ex-Factory price, excise duty, packing and forwarding, transportation, insurance, other local costs incidental to delivery and warranty/ guaranty commitments)	Total Price (A)	Sales tax and other taxes payable	
						In %	In figures (B)
Total Cost							

Gross Total Cost (A+B): Rs. _____

We agree to supply the above goods in accordance with the technical specifications for a total contract price of Rs. ———————— (Amount in figures) (Rupees ————————amount in words) within the period specified in the Invitation for Quotations.
We confirm that the normal commercial warranty/ guarantee of ———————— months shall apply to the offered items and we also confirm to agree with terms and conditions as mentioned in the Invitation Letter.
We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery.

Signature of Supplier
Name: _____
Address: _____
Contact No. _____