INVITATION FOR QUOTATION

TEQIP-II/2013/KL1G18/54 **31-Oct-2013**

To,

Sub: Invitation for Quotations for supply of Goods

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	**Brief Description**	**Quantity**	**Delivery Period(In days)**	**Place of Delivery**	**Installation Requirement (if any)**
1	AC/DC Voltage controller	1	75	College of Engineering Karunagappally	NA
2	Cyclo converter	1	75	College of Engineering Karunagappally	NA
3	Fully controlled bridge converter	1	75	College of Engineering Karunagappally	NA
4	Half controlled bridge converter	1	75	College of Engineering Karunagappally	NA
5	PWM Inverter	1	75	College of Engineering Karunagappally	NA

6	SMPS Trainer	1	75	College of Engineering Karunagappally	NA
7	TRIAC	1	75	College of Engineering Karunagappally	NA

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 II** 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, initialing, 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 **55** 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:

   Delivery and Installation - 0% of total cost

   Satisfactory Acceptance - 100% of total cost

10. All supplied items are under warranty of **36** months from the date of successful acceptance of items.
11. You are requested to provide your offer latest by **12:30** hours on **20-Nov-2013 .**
12. Detailed specifications of the items are at Annexure I.
13. Training Clause (if any) **yes**
14. Testing/Installation Clause (if any) **The item has to be tested for satisfactory performance**
15. Information brochures/ Product catalogue, if any must be accompanied with the quotation clearly indicating the model quoted for.
16. Sealed quotation to be submitted/ delivered at the address mentioned below,

    Thodiyoor P O,Karunagappally, Kollam Dist. Kerala State, Pin: 690523

    The Cover containing quotations shall be superscripted with "Quotation for TEQIP-II/2013/KL1G18/ 54- Power Lab Kit. Do not open before 12:30 hours on 20- NOV-2013" .

    Each bidder shall submit only one quotation for the given specifications. Additional multiple options/Offers cannot be considered in the same quotations. The quoted basic total price (A) as in the given format for quotation should be inclusive all charge. (Ex Factory price, excise duties

and levies, packing and forwarding, transportation, insurance, other local costs incidental to delivery, warranty/ guaranty commitments and consumables for testing etc.). sales Tax and other tax as payable should be shown separately. (B) as in the given format for quotation.

Successful bidder has to execute an agreement in the prescribed format in Kerala Stamp paper worth Rs 100/-. Also has to submit a Security deposit for 5 % of the total amount in the form of bank guaranty or Demand Draft.

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

(Authorized Signatory)

Name & Designation

Annexure I

Sr. No	**Item Name**	**Specifications**
1	AC/DC Voltage controller	AC/DC voltage controller with Firing angle variable from 0 to 180 degree through RAMP & Pedestal control method. Isolated gate signals are provided through pulse transformer. Potentiometer to vary the firing angle. Four nos. of SCR rated for 600Volts - VAK @ 12Amps in bridge configuration for DC regulator. Two nos. of SCRs in anti parallel configuration for AC regulator study. AC/DC regulator study ion is configured by patching the flexible patch chords. Built-in power supply. Test points are to be provided for detailed study of circuit signals by the students. All the components are mounted in an attractive cabinet. Mimic Logics to be provided in the panel for students easy reference. A Resistive load/lamp load to the load the AC/DC regulator output voltage. Meters to view the output voltage.
2	Cyclo converter	Single phase Cyclo converter with FIRING CONTROL CIRCUIT consists of 4 synchronized firing pulses, relevant power supply etc, for frequency division of 1, 2, 3 & 4. 4 synchronized firing pulses to trigger SCRs, Digital firing for frequency division of 1,2,3 & 4, Input 230V +10%, 50Hz single phase AC, +15V DC @ 0.5A regulated output for the trigger circuits,

		Frequency: 50/2 Hz, 50/3 Hz & 50/4 Hz. SCR POWER CIRCUIT- Four thyristors, SCR Rating : 600Volt @ 12Amp. The devices should be mounted on suitable heat sinks and placed inside a nicely designed cabinet. Snubber circuit is to be provided for each device. All SCR points are terminated at sockets for easy wiring by patch cords. Facilities for switching ON and OFF, the AC supply to the converter circuit with fuse protection. 230/24-0-24VAC for SCR power circuit input. It should be enclosed in a sleek cabinet, potentiometer to vary the firing angle, two toggle switches to the required converter frequency, test points to study SCR control pulses, reset switch for restart the converter operation. inter gap Reactance (1GR) - 120mH @ 1Amp, 3 Tapings each taping is percentage of 120mH (0%, 50%, 100%). All tapings are terminated at power banana Sockets for easy wiring by patch chords. One Fixed Resistive Load.
3	Fully controlled bridge converter	Sngle phase fully controlled bridge converter. Input: 240V A,C. 50 Hz, O/p: 220VDC, 2A with Ramp and Pedestal Trigger Circuit: One no. of phase control IC used for pulse generator, One no. of potentiometer used to vary firing angle (0-180º), Pulse amplifier and pulse isolation to be provided, 2 nos. of 1:1 pulse transformer used for pulse isolation, Necessary test points and SCR input and output connectors are to be provided for easy studying and patching. All are mounted on a wooden box. Power device circuit : 4 nos. of SCRs rated for 1200Volts-VAK & 25Amps IA . Each device is provided with RC snubber for dv/dt protection, 24Volt AC @ 2Amp to be provided for low voltage operation, In the low voltage operation the waveform should be seen using an oscilloscope without any isolation transformer, Fuse for output to avoid over current. Load- One fixed Resistive load and one fixed inductive load to be provided. All points are terminated on the front panel for wiring for each experiment.
4	Half controlled bridge converter	Single phase half controlled bridge converter, Variable firing angle with Ramp and Pedestal Trigger Circuit: One no. of phase control IC used for pulse generator, One no. of potentiometer to vary firing angle (0-180º), Pulse amplifier and pulse isolation to be provided. 2 nos. of 1:1 pulse transformer for pulse isolation, Necessary test points and SCR input and output connectors for easy studying and patching. All mounted on a wooden box. Power Device Circuit: 2 nos. of SCRs rated for 600Volts-VAK & 12Amps IA, 2 nos. of power diodes rated for 600volts 4Amps, Each

		device is to be provided with RC snubber for dv / dt protection and Fuses to avoid overload. One SPDT for on/off (24V AC) power circuit input AC volt. All the G, A, K & MT terminals are terminated on connectors to use patch chords to form any converter / inverter circuitry. 24Volt AC @ 2Amp provided for low voltage operation. In the low voltage operation the waveform should be seen using an oscilloscope without any isolation transformer. Load- One fixed Resistive load and one fixed inductive load to be provided. All points are to be terminated on the front panel for wiring for each experiment
5	PWM Inverter	Single phase pulse width modulated inverter: SINGLE PHASE IGBT MODULE with four IGBTs with gate driver. The gating signals are to be given as an input from an appropriate control module. Built in power supplies for the gate driver circuitry and the power circuit ±15V @ 1A and 24V @ 2A. The power supply through an isolation step down transformer after rectification and filtering. Gating signals isolated using opto isolators, the IR2110 gate drive IC's are used for driving the gates. Over current protection is to be provided through the gate drive IC. All terminals of the devices and 24V power supply terminals are to be brought out to banana sockets mounted at the front panel. Various converter configurations (single, Two or four quadrant chopper, single phase inverter) can be made by properly interconnecting the devices by using patch cards. The devices are of IRGBC20S, rated at 600V, 19A. Snubber circuit are to be provided for each of the devices to protect against high dv/dt. A hall effect current transducer to be provided for sensing the load current for control purposes as well as to provide protection. The mimic diagram showing the terminals of all the devices is to be SCR printed in the front panel for easy wiring. SINGLE PHASE PWM INVERTER CONTROL MODULE: The gating signals for a single phase full bridge inverter should be through an appropriate pulse width modulation (PWM) technique. Sinusoidal PWM, trapezoidal PWM, staircase pulse width modulation and hysteresis current control PWM techniques are to be provided. Any one of the PWM patterns can be ed through a or switch. The inverter output voltage and fundamental frequency can be controlled. The block schematic of the generation of the gating signals is to be SCReen printed at the front panel for easy understanding. Test points are to be provided to check the waveforms at various stages of the PWM circuitry. The gating signals are terminated at

		a nine pin connector. Built-in power supplies for the control circuitry , ±15V & 5V The module bought out in a sleek box ACCESSORIES: (1) RESISTIVE LOAD 50ohm/4 Amp rating,Variable type, Single phase AC or DC input, Tubular type. (2) SINGLE PHASE INDUCTIVE LOAD 120MHz , 4Amp rating, Single phase inductive load with 0, 15, 30, 45, 60, 75, 90, 120mH tapping,Iron core type, Banana connector to be provided for all inputs.
6	SMPS Trainer	Switch mode power supplies with INPUT POWER MODULE with one Auto transformer and a 230V/24 volt transformer to provide 0- 24Volt AC output to the DC-DC converter module. One single phase auto transformer to vary the input voltage and applied to the transformer input, so that the transformer output will vary from 0- 24Volt. One no. of 230/ 24V, 3Amp transformer provided for output isolation. One no. of 0-30V Ac voltmeter to indicate output voltage. One illuminated rocker switch to on/off input power. One fuse is provided to avoid over current. One pilot lamp to indicate power on/off. All outputs, auto transformer, voltmeter to be mounted on a screen printed PCB with nice cabinet. Inputs 0-230V AC, Output 0-24V AC/ 3Ampa variable, isolated DC-DC CONVERTER MODULE with TL494 based PWM controller IC operated at 63KHz (approx), IRF540/840 used as a power switch with suitable heat sinks, Provision for ion of single output or multi output by means of SPDT switch. Pulse is to be isolated by means of opto coupler. Output filtered by LC filter, All input, outputs are to be terminated by banana sockets. Necessary test points are to be provided on the board. Various fault analysis switches to study SMPS controller. One potentiometer to vary the frequency of PWM (External mode of operation).One potentiometer to vary the reference voltage of PWM controller IC. Input: 0-24V AC/ 3Amps, Output (Multiple): +5V/1Amp, +12V, -12V, Output (Single): +5V/1amp. ELECTRONIC LOAD- consists of one no. of 20-0-20V DC voltmeter to measure SMPS output voltages. One Ammeter 0-3Amps to indicate load current. One multi turn potentiometer to vary the PWM width which in term vary the load current. Input Voltage: +5V & 12Volt. Maximum load current: 1Amps for 5 volt. Input banana connectors and all meters are to be mounted on a screen printed PCB with nice cabinet

7	TRIAC	Single phase AC voltage controller kit using TRIAC Consisting of one BTA12 TRIAC with heat sink, LM723 Based 30V DC power supply for gate voltage, One no. of potentiometer used to vary the gate current, O-30V DC variable power supply for MT1, MT2 Voltage variation, One no. of toggle switch Provided for gate voltage on/off, 230V AC input, power on/off switch. All components are to be mounted on a screen printed PCB & fixed on a nice wooden cabinets. 3 meters (multimeter) to measure the power devices Current and voltage to find the static characteristics

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: _____