Indira Gandhi Engineering College, Sagar,Jabalpur Road, Baheriya Gadgad,
Near Makronia Railway Station, Sagar – 470021
Email Id – prinigec.sgr@mp.gov.in

INVITATION FOR QUOTATION

Package Code: TEQIP-III/2019/MP/igec/64
Package Name: IGEC/EE/PEL/EQIP/01 to 19

Current Date: 27-Sep-2019
Method: Shopping Goods

To,

Scientech Technologies Pvt. Ltd.
Indore, MadhyaPradesh-452010,
94, Electronic Complex Pardeshipura, Indore - 452010

Subject: INVITATION FOR QUOTATION 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	Item Name	Quantity	Place of Delivery	Installation Requirement (if any)
1	Digital measuring instruments for V-I characteristics of SCR and to measure latching and holding currents	2	EE Department, I.G. Engineering College, Sagar	
2	To study UJT trigger circuit for half wave and full wave control	2	EE Department, I.G. Engineering College, Sagar	
3	To study single-phase half wave controlled rectified with (i) resistive load (ii) inductive load with and without freewheeling diode	1	EE Department, I.G. Engineering College, Sagar	
4	To study single phase (i) fully controlled (ii) half controlled bridge rectifiers with resistive and Inductive loads	2	EE Department, I.G. Engineering College, Sagar	
5	To study three-phase fully/half controlled bridge rectifier with resistive and inductive loads	2	EE Department, I.G. Engineering College, Sagar	
6	To study single-phase ac voltage regulator with resistive and inductive loads	1	EE Department, I.G. Engineering College, Sagar	
7	To study single phase cyclo-converter	2	EE Department, I.G. Engineering College, Sagar	
8	To study triggering of (i) IGBT (ii) MOSFET (iii) power transistor	2	EE Department, I.G. Engineering College, Sagar	
9	To study operation of IGBT/MOSFET chopper circuit		EE Department, I.G. Engineering College, Sagar	
10	To study MOSFET/IGBT based single-phase series-resonant inverter	2	EE Department, I.G. Engineering College, Sagar	
11	To study MOSFET/IGBT based single-phase bridge inverter	2	EE Department, I.G. Engineering College, Sagar	
12	To study the Static Characteristics of MOSFET & IGBT	2	EE Department, I.G. Engineering College, Sagar	
13	Forced commutation circuits(Class A, Class B, Class C, Class D and Class E)	2	EE Department, I.G. Engineering College, Sagar	
14	Induction motor using AC voltage controller	1	EE Department, I.G. Engineering College, Sagar	
15	Single phase AC voltage control by using TRIAC for R and RL load	2	EE Department, I.G. Engineering College, Sagar	
16	R, R-C & UJT Firing Module	2	EE Department, I.G. Engineering College, Sagar	
17	COMMUTATION (CHOPPER) CIRCUIT MODULE	2	EE Department, I.G. Engineering College, Sagar	
18	DC-DC Boost Converter	2	EE Department, I.G. Engineering College, Sagar	
19	DC-DC Buck Converter	2	EE Department, I.G. Engineering College, Sagar	

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 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. 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. 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, Acceptance, Installation & Testing	30	100

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 **24** months from the date of successful acceptance of items and AMC/Others is **No**.
12. You are requested to provide your offer latest by **14:30** hours on **15-Oct-2019.**
13. Detailed specifications of the items are at Annexure I.
14. Training Clause (if any) – **Training on operation and handling of equipments free of cost as per department requirements.**
15. Testing/Installation Clause (if any) – **Full installation and testing/demonstration free of cost.**
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, **Indira Gandhi Engineering College, Sagar, Jabalpur Road, Baheriya Gadgad, Near Makronia Railway Station, Sagar – 470021**
19. **Qualification Criteria** : The bidder/supplier should have :
    19.1 A minimum of 3 years experience of supplying similar items.
    19.2 A turnover of Rs. 100 lakhs at least once in three years.
    19.3 Not been blacklisted by any Government Institution/Organization.
20. The quotation should include the following information :
    20.1 The copies of original documents defining the constitution or legal status, place of registration and principal place of business of the company firm or partnership etc. in India.
    20.2 Report on financial status (balance sheet and auditor's report for the past three years).
    20.3 An affidavit for not being blacklisted by any Government Institution/Organization.
    20.4 Authorization Certificate from the OEM/Principal (if bidder/supplier is not an OEM) assuring full guarantee and warranty obligations during the liability period, for the goods offered.
    20.5 The list of clients duly supported by copies of purchase orders, installation and performance report signed by purchasers/users.
21. In case of failure to supply the goods within the prescribed time and in accordance with the specifications given in the contract/purchase order, the institute shall be free to cancel the order and make purchase from the next higher tenderer/from the open market as the case may be.
22. The competent authority reserves the right to increase or decrease the quantity of any item of sale, during the period of contract. The tenderer/bidder will be bound to comply with the order of the competent authority without any claim and compensation.
23. Any controversy will be subject to disposal in Sagar Jurisdiction only.
24. Damaged, defective or substandard material will not be accepted under any circumstances.
25. Preference will be given to :
    25.1 The bidders possessing relevant certification by an authorized body such as ISO etc., copy of which must be enclosed.
    25.2 The bidders that have quoted the item certified for standard, quality and safety such as BIS, ISI etc., copies of which must be enclosed.
26. Please mention following on top of the sealed quotation submission envelope –
    26.1. TEQIP – III
    26.2 Package Code
    26.3 Don't open before 02:30 PM on 15 Oct, 2019.
27. 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	Digital measuring instruments for V-I characteristics of SCR and to measure latching and holding currents	Complete setup with digital measuring instruments to study V-I characteristics of SCR and to measure latching and holding currents Demonstration board with following facilities :- Isolated 0-230 V DC variable source – 1 Set, Isolated 0-600 V DC variable source – 1 Set, Isolated 0-12 V DC variable source – 2 Sets, External Load – 3 Nos., SCR, Multimeter, Lamp 15 Watt 230 V – 2 Nos., Patch Cords, Demonstration Board Cover, Set of Patch Chords & Manual with all other accessories and equipment to perform the above experiment. Experiments To conduct SCR Shorted gate experiment To conduct biased (Forward & Reverse) gate SCR firing experiments.
2	To study UJT trigger circuit for half wave and full wave control	Complete Setup to study UJT trigger circuit for half wave and full wave control Setup will consist of demonstration board with following facilities :- Isolated AC 230 V & 14 V Supply, 10:1 Resistive Attenuator for observation on CRO, Fuse for short circuit protection, 25 Watt 250 V Lamp, Demonstration Board Cover, Triggering circuits, Set of Patch Chords & Manual with all other accessories and equipment to perform the above experiment.
3	To study single-phase half wave controlled rectified with (i) resistive load (ii) inductive load with and without freewheeling diode	Complete Setup to study single-phase half wave controlled rectified with (i) resistive load (ii) inductive load with and without freewheeling diode The setup is provided with isolation transformer for C.R.O. protections and lamp bank. Demonstration Board with following facilities :- Single Phase Half Controlled Bridge, Firing Pulse Generator, Resistive Load (Lamp), Inductive Load (Choke), Voltmeter 0-300V, Ammeter 0-5A, 1:10 Attenuator for CRO, Isolated 220 V AC for CRO. DC Motor 1 HP, Connecting Leads, Lamp Holder, Lamps 250 Volts. Complete experimental setup with DC Motor & Engraved Panel board with Banana Sockets for ease of connections by students. Set of Patch Cords & Manual with all other accessories and equipment to perform the above experiment.
4	To study single phase (i) fully controlled (ii) half controlled bridge rectifiers with resistive and Inductive loads	Complete Setup to study single phase (i) fully controlled (ii) half controlled bridge rectifiers with resistive and Inductive loads Features : 230V, AC Isolated Transformer, Power 50 Watt, 9V DC at 100 mA Zener Regulated Power Supply: Two UJT, Two Pulse Transformer1:1:1, Two Potentiometers for controlling UJT firing angle, Bulb 40W, 230 AC, Adequate no of others Electronics Components, Panel meter for measurement of voltage & current, Set of Patch Chords & Manual with all other accessories and equipment to perform the above experiment.
5	To study three-phase fully/half controlled bridge rectifier with resistive and inductive loads	Complete Setup to study three-phase fully/half controlled bridge rectifier with resistive and inductive loads Features : Three Phase line commuted fully-controlled thyristorized bridge converter, Miniature Circuit Breaker (MCB), Three cards consisting of Zero Crossing Detector, Integrator, Comparator and Pulse Generator one for each phase, for controlling thyristors. Another card in conjunction with above three cards for controlling the triggering angles of the negative group of three thyristors, Firing angle control potentiometer, 415:50V transformer for rectification and low voltage AC supply for triggering, 12V at 500mA, power supply for triggering circuit, Six nos. Driver Circuits with Pulse Transformer, R & L load with Load voltage divider, Panel meter for measurement of voltage & current, One freewheel diode.• Unearthed mains sockets for CRO.
6	To study single-phase ac voltage regulator with resistive and inductive loads	Complete Setup with motor to study single-phase ac voltage regulator with resistive and inductive loads Complete setup with fraction Horse Power Motor. AC Phase Control training unit with following facilities :- Isolated 230 V or 50 V supply, Fuse for Short Circuit protection, AC Phase control by RC Triggering, AC Phase Control by UJT Triggering, 10:1 Potential Divider for CRO. Protection Cover - 1 No., Lamp 25 Watt, 230 V - 1 No., 1/2 hp motor (If required), Set of Patch Chords & Manual with all other accessories and equipment to perform the above experiment.

7	To study single phase cyclo-converter	Complete Setup to study single phase cyclo-converter The experimental setup consists of :- (i) Power Circuit consisting of two fully controlled Bridge Converter connected in anti-parallel (Bridges P & N). Bridge P supplies load current in the positive half of output cycle and bridge N provides load current in the negative half of output cycle. (ii) Firing Circuit consists of Micro Controller Based Firing Unit which provides Isolated Gate pulses through pulse transformers separately for P & N Bridges. Toggle switch is provided to select the output frequency (1/1f, 1/2f, 1/3f, 1/4f, 1/5f). Firing angle can be changed either :- a) Through toggle switches for increasing and decreasing of firing angle. Firing angle during all half cycles of AC input supply remains same in this mode of control. b) Through serial port of computer by connector provided on the experimental kit to the serial port of computer and then entering the firing angle to the key board, In this mode of control the firing angle of each half cycle of input supply can be independently Controlled, Set of Patch Chords & Manual with all other accessories and equipment to perform the above experiment.
8	To study triggering of (i) IGBT (ii) MOSFET (iii) power transistor	Complete setup to study triggering of (i) IGBT (ii) MOSFET (iii) power transistor Complete experimental setup consisting demonstration Board with following facilities:- 110 V DC Supply, Different testing points, 1:10 Attenuator for CRO, Triggering Generator, IGBT, Mosfet & Power Transistor, Lamp 15 Watt 250V, Connecting Leads.
9	To study operation of IGBT/MOSFET chopper circuit	Complete Setup to study operation of IGBT/MOSFET chopper circuit This is DC chopper circuit for getting a variable DC voltage by using on time control and frequency control to feed DC (Universal Motor). Circuit demonstrate the use of smooth speed variation with the help of chopper circuit and test Points are provided. Demonstration Board with following facilities :- 110 V DC Supply, Different testing points, 1:10 Attenuator for CRO, DC Voltmeter, DC Amp Meter, Lamp 60 Watt 250V, Connecting Leads, FHP motor.
10	To study MOSFET/IGBT based single-phase series-resonant inverter	Complete Setup to study MOSFET/IGBT based single-phase series-resonant inverter Complete experimental setup consisting of :- 1. Demonstration Board with following facilities :- Isolated DC 110 V, Isolated Gate Frequency, External Load, 200 W Lamp for Short Circuit Protection, 1:10 Resistive Attenuator, 1A Fuse for short circuit protection. 2. Demonstration Board Cover 3. Patch Cords diagram and necessary test point are clearly marked on Engraved front panel for education All the circuit study purpose.
11	To study MOSFET/IGBT based single-phase bridge inverter	Complete Setup to study MOSFET/IGBT based single-phase bridge inverter Consisting of Demonstration Board with following facilities - Isolated DC 110 V, Isolated Gate Frequency, External Load, 200 W Lamp for Short Circuit Protection, 1:10 Resistive Attenuator, 1A Fuse for short circuit protection. Demonstration Board Cover, Patch Cords. All the circuit diagram and necessary test points should be clearly marked on Engraved front panel for education study purpose.
12	To study the Static Characteristics of MOSFET & IGBT	Complete setup to study the Static Characteristics of MOSFET & IGBT Setup consist of : 1. Power module : 20A MOSFET mounted on proper heat sink and protection by fuse, 20A IGBT mounted on proper heat sink and protection by fuse. 2. Digital panel meters: Two voltmeters and an ammeter to measure Vds, Vg and Id respectively. 3. Power Supplies: A variable D.C Power Supply of 0-5V/ 500 mA for gate current, A variable D.C Power Supply of 0-100V/ 1A for Load current. 4. Load: A variable load resistance 5KΩ/ 100W.
13	Forced commutation circuits(Class A, Class B, Class C, Class D and Class E)	Forced commutation study unit for Class – A, Class – B, Class – C, Class – D & Class – E, It can be loaded 300Ω, 1.7A Rheostat. Input – 230V, 50Hz.
14	Induction motor using AC voltage controller	Induction motor using AC voltage controller. Synchronized pulse transformer isolated trigger pulse: This triggering pulse can be used to trigger Single phase AC phase control using SCR's (Anti Parallel SCR's), Single phase AC phase control using TRIAC, Single phase half wave rectifiers (Single SCR's), Single phase full wave rectifiers (Two SCR's),

		Single phase half controlled bridge rectifiers (Two SCR's and two diodes). The firing circuit is based on zero crossing detector, ramp generator, Op-amp, comparator, amplifier with pulse isolation. Speed variation: 0-maximum (0-1800) Power Circuit: The power circuit consists of 2 SCR's, 3 diodes and a TRIAC (40A/1200V). The power device should be mounted on suitable heat sink for power dissipation. The snubber ckt. is connected for dv/dt protection. A fuse is provided in series with device for short circuit or over voltage protection. MCB is provided for protection of the device. Digital panel meters: Digital AC/DC Voltmeter & ammeter for measurement for input/output voltage & current. Universal Motor: 0.5 hp/230V. Digital Non contactor type tachometer: Range:- 0-999 RPM.
15	Single phase AC voltage control by using TRIAC for R and RL load	Single phase ac voltage controller for using TRIAC and DIAC combination connected to R, & R-L load. This unit consists of RC phase shifting components, DIAC, TRIAC with snubber ckt. For 220Ω, 2.8 resistive load and a single phase fan load.
16	R, R-C & UJT Firing Module	R, R-C & UJT Firing Module. Technical specifications: This module should consist of three basic gate firing circuitries to study line commutated converters. A SCR should be provided so that limited experiments can be conducted using this module. Separate controls should be provided to vary firing angle in R, R-C & UJT firing. One SCR rated for 600V – VAK & 12A IA should be provided with all terminals (G, A&K) terminated on the front panel. One 24V AC with ON/OFF switch should be provided. One illuminated Rocker switch for power ON/OFF should be provided. All firing pulses should be terminated on front panel. All the important test points should be mounted on front panel for measure the waveform available through CRO. Power supply # Input 230V AC +10% @ 50 Hz
17	Commutation (chopper) circuit module	COMMUTATION (CHOPPER) CIRCUIT MODULE. Technical Specification: CHOPPER FIRING CIRCUIT- 2 Isolated gate signals for 2 SCRs should be provided, Isolation through pulse transformer, Provision to be provided to vary the duty cycle ratio, 2 switches should be provided to release the gate signals to the two SCRs. POWER DEVICE CIRCUIT- Two nos. of SCRs rated for 600Volts – VAK & 12Amps Ia should be provided, One no. of power diodes rated for 600 V & 4 Amps, Each device should be provided with RC Snubber for dv/dt protection, Fuses to avoid overload, All the G, A, K & MT terminals should be terminated on connectors to use patch chords to form any Converter / Inverter circuitry, 24V DC @ 2Amp regulated output for DC Chopper. One commutation capacitor should be provided should be used for class B and class D commutation circuits. One fixed load Resistance should be provided.
18	DC-DC Boost Converter	DC – DC BOOST CONVERTER. Technical Specifications BOOST CONVERTER PWM CONTROL CIRCUIT: PWM controller for converter PWM generation, 1 no. potentiometer should be provided to set voltage adjustment, 1 no. of DPDT switch should be provided for open loop/closed loop selection, 1 no. of pulse socket should be provided for feedback voltage-interface, 1 no. of pulse socket should be provided for PWM output-interface. Various test points should be provided for wave form measurement. Circuit diagram printed in the front panel PCB. One number of power on/off switch with indicator. BOOST CONVERTER POWER CIRCUIT: 1 no. of IRF250 power MOSFET should be provided for power device, High speed opto should be provided for MOSFET PWM isolation, IR2110 IC should be provided for MOSFET PWM driver, 1 no. of high-frequency inductor and capacitor and diode should be provided for power ckt, 1 no. of output voltage divider circuit should be provided for feed -back voltage, 1 no. of pulse socket should be provided for feedback voltage-output, 1 no. of pulse socket should be provided for PWM input, 1 no. of fixed R-should be provided for load resistor. Low value (0.2e) resistor should be provided in varies sections of power circuits for current waveform measurement. Banana connectors should be provided for power circuit input and outputs. Fuse should be provided for output side for over load

		protections. Specifications: Input: 0-15vdc@, Output: 0-30v dc @ 0.5amp 30V VARIABLE DC SUPPLY FOR POWER CIRCUIT INPUT: Variable dc power supply, 0-30vdc output @ 2amp capacity, 1 no. of potentiometer should be provided for output voltage variation, 1 no. of potentiometer should be provided for output current variation, 1 no. of Led display should be provided for o/p voltage / current measurement, Built in over-current limit facility.
19	DC-DC Buck Converter	DC – DC BUCK CONVERTER Technical Specification BUCK CONVERTER PWM CONTROL CIRCUIT:PWM controller for converter PWM generation, 1 no. potentiometer should be provided for set voltage adjustment, 1 no. of DPDT switch should be provided for open loop/closed loop selection, 1 no. of pulse socket should be provided for feedback voltage-interface, 1 no. of pulse socket should be provided for PWM output-interface, Various test points should be provided for wave form measurement. Circuit diagram printed in the front panel PCB. 1 no. of power on/off switch with indicator. BUCK CONVERTER POWER CIRCUIT: 1 no. of IRF250 power MOSFET should be provided for power device. High speed opto should be provided for MOSFET PWM isolation.IR2110 IC should be provided for MOSFET PWM driver. 1 no. of high-frequency inductor and capacitor and diode should be provided for power circuit. 1 no. of output voltage divider circuit should be provided for feed -back voltage. 1 no. of pulse socket should be provided for feedback voltage-output. 1 no. of pulse socket should be provided for PWM input. 1 no. of fixed R-should be provided for load resistor. Low value (0.2e) resistor should be provided in various sections of power circuits for current wave-form measurement. Banana connectors should be provided for power circuit input and outputs. Fuse should be provided for output side for over load protections. Specifications: Input : 0-25vdc, Output: 0-5VDC@1Amp 0-30V VARIABLE DC SUPPLY FOR POWER CIRCUIT INPUT: Variable dc power supply, 0-30vdc output @ 2amp capacity, 1 no. of potentiometer should be provided for output voltage variation, 1 no. of potentiometer should be provided for output current variation, 1 no. of led display should be provided for o/p voltage / current measurement, Built in over-current limit facility.

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. _____