



National Institute of Technology Sikkim

Barfung Block, Ravangla, South Sikkim Pin Code-737139

INVITATION LETTER

Package Code: TEQIP-III/2019/ntst/92

Current Date: 09-Apr-2019

Package Name: NITS/TEQIP-III/ECE/04

Method: Shopping Goods

Sub: INVITATION LETTER FOR NITS/TEQIP-III/ECE/04

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	Equipment for Optical Communication Laboratory	1	Nit Sikkim, Ravangla, South Sikkim - 737139	Required


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.

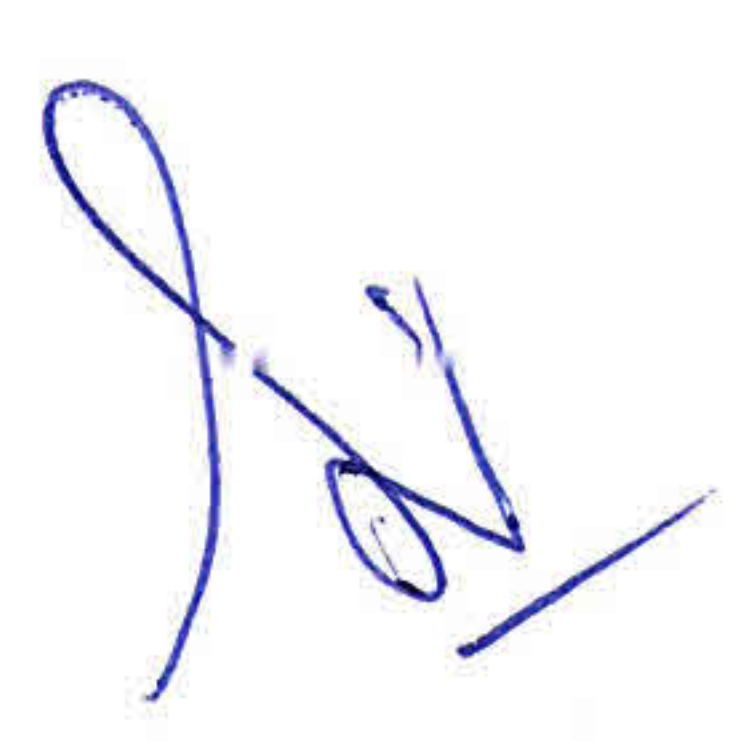
3. **Quotation**

- 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 **45**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:
- Satisfactory Delivery & Installation - 10% of total cost**
Satisfactory Acceptance - 90% of total cost
10. Liquidated Damages will be applied as per the below:
Liquidated Damages Per Day Min % : 0
Liquidated Damages Max % : 10
11. All supplied items are under warranty of **24** months from the date of successful acceptance of items and AMC/Others is **NA**.
12. You are requested to provide your offer latest by **17:30** hours on **13-May-2019**.
13. Detailed specifications of the items are at Annexure I.
14. Training Clause (if any) **YES**
15. Testing/Installation Clause (if any) **YES**
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,
National Institute of Technology Sikkim, Barfung Block, Ravangla, South Sikkim Pin Code-737139
19. We look forward to receiving your quotation and thank you for your interest in this project.


Dr. Achintesh N. Biswas
Nodal Officer (Procurement)
TEQIP-III
National Institute of Technology Sikkim



Annexure-I

SNo	Item	Technical Specifications
1.	Basic Building Block of an OTDR/WDM/Chromatic Dispersion and Optical Network System	<p>Building Block of an OTDR/WDM/Chromatic Dispersion and Optical Network should consist of the following 4 Modules and an Optical Power Meter.</p> <p>a. Dual Wavelength (1310nm & 1550nm) LASER Source and Detector Module with inbuilt Pulse generator and Driver for Analog and Digital Transmission. LASER - 2 Nos Central wavelength: 1310nm and 1550nm Output power: 1mW Detectors – 2 Nos Type : PIN photodiode & PIN TIA Spectral Bandwidth : 1250nm to 1600nm Pulse Generator: Pulse width : 30ns & 100ns with amplitude approx.. 4V_{peak} Display : 3½ Digit seven segment display indication for forward voltage and current Input Selectable from : CW, Pulse, Analog, TTL and RS-232</p> <p>b. Passive Component Module in a casing consisting of Coupler, Isolator, Attenuator and 2 X WDM -- 02 nos COUPLER: Coupling ratio:50:50 - 1 No WDM 1&2: Operating wavelength 1310nm & 1550nm - 1 each ISOLATORS I & II: Isolator I at 1310nm & Isolator II at 1550nm – 1 each ATTENUATOR I & II: Attenuation of attenuator 5dB & 10dB - 1 each</p> <p>c. Single Mode Optical Glass Fiber Module in a casing of Length 100 Mts, 500 Mts& 1000 Mts. – 02 Nos This Module should be provided in a rugged casing so as to prevent the damage to the Fiber . Type of fiber : Singlemode, 9/125 micron (100mts , 500Mts and 1 Km)</p> <p>d. Optical Power Meter: should be provided to measure the power of different sources Wavelength (nm) : 800 ~ 1650, Detector : InGaAs Optical connector : FC /SC /ST Universal 2.5mm adaptor Measurement range (dBm) : -70 ~ +10 Standard wavelength (nm) : 850/ 980/ 1310/ 1490 / 1550/ 1625</p> <p>e. Chromatic Dispersion Module</p> <ul style="list-style-type: none"> • Specially designed to perform chromatic dispersion experiment • A special purpose fiber is provided for laboratory use to make study more perfect and easy • Length of fiber : 25Kilometer • Type of fiber : Singlemode • Attenuation : □□0.05dB/km@1285 ~ 1330nm and 1525nm ~ 1575nm • Cable cutoffwavelength : □□1260nm • Chromatic dispersion : □□3.5ps/(nm.km) @ 1285 nm ~ 1330nm) • Zero dispersion : 1300 nm ~ 1320nm wavelength • Multimedia based interactive e-manual



2.	Erbium Doped Fiber Amplifier Training System	<p>EDFA training system should be a bench-top integrated module designed to understand the principles of Optical Amplification and provide hands-on experience in building Erbium Doped Amplifier. This system enables the student to measure the optical amplifier characteristics under forward and backward pumping schemes. This system should operate in PC control mode with USB Interface and have facility for Internal and external Modulation</p> <p>SPECIFICATIONS</p> <p>The Bench-top Integrated EDFA Training System should consist of all the Optical Devices and Components integrated in sturdy Aluminium Casing for protection.</p> <ol style="list-style-type: none"> 1. LASER DIODE@1550 nm : 1.25 Gbps Laser Diode Module at 1550nm, In built Isolator Threshold Current I_{th}: 10 mA Typical, Output optical power 1mW. 2. PUMP LASER@ 980 nm: Up to 100mW 980nm Pump Module, Minimum Kink-Free Power $P_{max}(mW) - 120$. Uncooled. 3. PUMP LASER DRIVER: Max sink current – 3A. Multi-channel. Voltage controlled current sink. 4. OPTICAL DETECTOR: 1.3 GHz InGaAs PIN Photodiode Module. Responsivity: Typical 0.9 A/W in 9/125 μm Fiber, Spectral Range: 1250nm to 1600nm. 5. WAVELENGTH DIVISION MULTIPLEXER: Operating Wavelength(nm): 980/1550, Isolation > 20 dB Directivity > 60 dB 6. ERBIUM DOPED FIBER: C – Band Single Mode Fiber with 20 mtrs length 7. OPTICAL FILTER MODULE: Center Wavelength : 1550nm @ 2nm BW 8. VARIABLE ATTENUATOR. Attenuation Range:0.8 to 60 dB <p>SOFTWARE</p> <ul style="list-style-type: none"> • User friendly GUI for monitoring and controlling of EDFA system • Operating modes like CW mode, VI characteristics mode, Internal & External Modulation. • Internal Modulation frequencies – 100Hz, 200Hz, 500Hz, 1KHz. • LASER controls like Supply ON/OFF, wavelength selection & driving current selection. • Real time output signal monitoring of Photo-detector. <p>EXPERIMENTS</p> <ul style="list-style-type: none"> • Measuring Small-Signal Gain • Measuring Gain Saturation • Measuring Saturation Output Power • Measuring Pump Saturation • Measurements under Modulation. • Implementation of Forward Pumping and Backward Pumping.
3.	Coarse Wavelength Division Multiplexing and Add- Drop De-multiplexing Training System	<p>Coarse Wavelength Division Multiplexing system should be a bench-top integrated module to cover practical aspect of implementing the design by study of optical component parameters and verifying their performance. De multiplexing of wavelengths should be demonstrated along with the recovery of the transmitted signal. Channel addition and deletion (dropping) should be implemented using Bragg grating and three port optical circulator. This system should operate in PC control mode with USB Interface and have facility for Internal and external Modulation</p> <p>SPECIFICATIONS</p> <p>The Bench-Top Integrated CWDM System should consist of all the</p>

		<p>Optical Devices and Components integrated in sturdy Aluminium Casing for protection.</p> <p>Lasers – 4 Nos</p> <ul style="list-style-type: none"> • 1.25Gbps CWDM Laser Diode Modules at wavelengths of 1510nm,1530nm,1550nm,1570nm • In built Isolator • Channel spacing : 20 nm • Modulation : Digital modulation with maximum external modulation frequency 5MHz <p>Internal Modulation frequencies – 100Hz, 200Hz, 500Hz, 1KHz.</p> <ul style="list-style-type: none"> • Output optical power : 1mW. <p>Detectors – 4 Nos</p> <ul style="list-style-type: none"> • 1.5 GHz InGaAs PIN Photo diode Module • Spectral Range : 1250nm to 1600nm • Responsivity : Typical 0.9 A/W in 9/125 μm Fiber. <p>CWDM multiplexer and demultiplexer (4 channels)</p> <ul style="list-style-type: none"> • Center Wavelength 1510nm,1530nm,1550nm,1570nm • Channel spacing : 20nm • Max Optical Power : 300 mW <p>Three Port Circulator</p> <ul style="list-style-type: none"> • Polarization Independent Optical Circulator • Band : C+L <p>Fiber Bragg Grating : Central Wavelength : 1550 + 0.5nm</p> <p>Software</p> <ul style="list-style-type: none"> • User friendly GUI for monitoring, controlling of CWDM system • Operating modes like CW mode, VI characteristics mode, Internal & External Modulation • LASER control like Supply ON/OFF, wavelength selection and driving current • Real time signal level monitoring of Photo-detector. • Graphical representation : XY plot of VI characteristics and Internal Modulation <p>EXPERIMENTS</p> <p>Component characteristics</p> <ul style="list-style-type: none"> • Diode laser characterization • MUX & DEMUX characterization • Optical circulator characterization • Bragg Grating characterization <p>Optical communication system</p> <ul style="list-style-type: none"> • 4 Channel CWDM by internal & external modulation • Add/Drop using Circulator & Bragg Grating
4.	ADVANCE FIBER OPTIC LAB FOR PLASTIC FIBER	<p>FIBER OPTIC COMMUNICATION LAB TRAINERS SHOULD CONSIST OF 4 Trainers with 2 FG as a Set consisting of</p> <p>a.Fiber optic analog transmitter kit</p> <p>Transmitter: 2 Nos.Peak wavelength of emission 660nm visible Red (SFH 756V),</p> <p>Peak wavelength of emission 950nm infrared (SFH 450V).</p> <p>Pulse amplitude modulation, Amplitude modulation, 4 channel analog Time division multiplexer blocks</p> <p>b. Fiber optic analog receiver kit</p> <p>Receiver: 2 Nos.Photo Diode with responsivity of 0.3 uA /uW (SFH 250V),</p> <p>Photo Transistor with responsivityof 80 uA/uW (SFH350V).</p> <p>Evelop detector, 4 channel analog Time division demultiplexer, signal strength indicator blocks</p>

		<p>c. Fiber optic analog and digital modulation demodulation kit Transmitter: Peak wavelength of emission 660nm visible Red (SFH 756V) Receiver: 2 Nos. Photo Diode with responsivity of 0.3 uA /uW (SFH 250V), Photo detector with TTL logic output (SFH551V). Pulse width modulation, pulse position modulation, 2 Channel FDM</p> <p>d. Fiber optic digital communication kit Transmitter: Peak wavelength of emission 660nm visible Red (SFH 756V) Receiver: Photo detector with TTL logic output (SFH551V). 8 Channel digital TDM, Bit error rate measurement, PRBS generation, 2 nos. 8-bit switch selectable markers PCM voice coding using MC145502 CODEC chip. Voice communication using telephone handsets. FUNCTION GENERATOR TWO UNITS:</p>
5.	FIBER OPTIC TRAINER KIT FOR GLASS AND PLASTIC FIBER	<p>Single Board System having LASER Diode and LED with corresponding Detectors.</p> <p>Source 1</p> <ul style="list-style-type: none"> Type: Laser Central wavelength: 1310nm Output power : 1.5mW <p>Source 2</p> <ul style="list-style-type: none"> Type: Visible LED Central wavelength: 660nm Receptacle housing: "Connector-less" style package <p>Detector 1</p> <ul style="list-style-type: none"> Type: InGaAs PIN photo diode Spectral Bandwidth : 1250nm ~ 1600nm Responsivity : 0.9 A/W @ 10 μW of 1310 nm Bandwidth : 1.5 GHz <p>Detector 2</p> <ul style="list-style-type: none"> Type : Silicon PIN photo transistor Spectral Bandwidth : 400 nm ~ 1100nm Max. Photosensitivity Lambda : 850 nm. <p>Fiber cable cable</p> <p>Type : Glass fiber single & multimode</p>
6.	Physics of Fiber Optics Lab	<p>Physics of Fiber Optic System laboratory should have the following components required to complete a series of experiments. The below mentioned System should be quoted as SET as we need compatibility. This System should consist of the following</p> <p>He-Ne laser source with 2mW output power at 633.5 nm wavelength along with LASER Holder</p> <p>Laser to fiber coupler with Lens adjustment facility to adjust beam into core of fiber, Coupling Efficiency of >70% for SM fibers and > 90% for MM fibers, Wavelength of operation 180 to 2000 nm, Power Handling capacity more than 1 watt.</p> <p>Laser to Fiber Coupler for Bare Fiber with X-Y-Z Positioners.</p> <p>Laser power meter with separate Sensor unit with stand and separate display unit, Power measurement range upto 40mW, Wavelength of operation 400 to 1100 nm and calibrated to 633nm</p> <p>Optical Breadboard with Dimension of 60cm X 60cm.</p> <p>X-Y-Z Fiber Positioners and Rotary stage with angle rotation of</p>

		<p>isteps better than 1/2 degree</p> <p>Optical Fiber Cable of length 1 Km , 500 Mts and 100 Mts .</p> <p>Optical patchchords and accessories required for experimentation purpose:</p> <p>9 /125 micron single mode glass fiber patchchord</p> <p>62.5 /125 micron multimode glass fiber patchchord</p> <p>100/140 micron multimode glass fiber patchchord</p> <p>Display screen</p> <p>List of Experiments that should be possible with the above set up</p> <ol style="list-style-type: none"> 1. Mode Observation 2. Coupling of Laser to Fiber and measuring the coupling efficiency 3. Attenuation Measurement using Cut Back Method 4. Calculation and Measurement of far field pattern of optical fiber as a function of angle 5. Numerical Aperture Measurement of Optical Glass Fiber
7.	Fiber Optic Connectorization and Splicing Kit	<p>Connectorisation Cum Splicing Kit with multimedia interactive eManual</p> <p>DELIVERABLES</p> <p>ST fiber polishing disc : 01 no.</p> <p>Fiber polishing sheets : Quantity 10</p> <p>Fiber polishing pad : 01 no.</p> <p>Fiber optic zoom microscope : 01 no.</p> <p>Fiber optic diamond scribe : 01 no.</p> <p>Jacket stripper : 01 no.</p> <p>Buffer stripper : 01 no.</p> <p>Universal crimp tool : 01 no.</p> <p>Tweezer : 01 no.</p> <p>Optic prep : 01 pack</p> <p>Cotton swabs : 01 pack</p> <p>Disposable syringe with needle : Quantity 02</p> <p>ST connector : Quantity 10</p> <p>Epoxy : 10 packs</p> <p>Ultra splice : Quantity 05</p> <p>Measurement scale : 01 no.</p> <p>Optical Multimode Fiber: 100 mtrs * 2 sets</p> <p>Optical Power Source : 1 No</p> <p>Optical Power Meter: 1 No</p> <p>Carrying case : 01 no.</p> <p>Instruction manual : 01 no.</p>

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. _____