



Indian Institute of Technology Ropar
Nangal Road, Rupnagar-140001

TENDER DOCUMENT

TENDER FOR PROVIDING DATA NETWORKING AT NIELIT CAMPUS

under

TWO BID SYSTEM

889-17/CS-10025/Nielit/Instt/PS

dated 07-08-2017

TENDER NOTICE FORM

1.	Mode of Tender	Two Bid System i) Technical Bid ii) Price Bid
2.	Name of work/service	Networking AT NIELIT CAMPUS
3.	Earnest Money	Rs. 50,000/- (in the shape of Demand Draft drawn in favour of Registrar, IIT Ropar payable at Rupnagar/Ropar)
4.	Last date and time of receipt of bids	Up to 3:00 P.M. on 14.08.2017
5.	Date, Time & Venue for opening of Technical Bids	3:30 P.M. on 14.08.2017 Conference Room, IIT Ropar
6.	Date and time of opening of Financial Bids.	Shall be intimated to the qualified bidders separately.
7.	Validity of Offer	90 days.

Technical Bid Format

1.	Name & Address of Registered Office of the Company/ Firm / Agency Telephone No. FAX No: E-Mail:							
2.	Name of the proprietor / Director of Company/Firm/ Agency quoting this tender							
3.	Tender Fee (Tenders without Tender Fee shall not be entertained)	<table><tr><td>DD No.</td><td>Date</td><td>Amount(Rs.)</td></tr><tr><td>_____</td><td>_____</td><td>500/-</td></tr></table>	DD No.	Date	Amount(Rs.)	_____	_____	500/-
DD No.	Date	Amount(Rs.)						
_____	_____	500/-						
4.	EMD (Tenders without EMD shall not be entertained)	<table><tr><td>DD No.</td><td>Date</td><td>Amount(Rs.)</td></tr><tr><td>_____</td><td>_____</td><td>50,000/-</td></tr></table>	DD No.	Date	Amount(Rs.)	_____	_____	50,000/-
DD No.	Date	Amount(Rs.)						
_____	_____	50,000/-						
5.	The firm should have annual revenue turnover of Rs.1 crore or above from businesses relating to sales and support for computers / Networking Systems, Computer Hardware in India during the last 2 years. Company should furnish copies of audited balance sheets for the last two years in support of annual revenue turnover or Certificates issued by Accounts Auditors.							
6.	The authorized bidder (other than OEM) should be in existence from last 5 years and should be in business of IT/Networking/Electronics/ Telecommunication/ during last 3 years in India.							
7.	The bidder should have similar experience of executing and maintaining LANs in Government Sector i.e. Public Sector Undertakings, Autonomous Bodies, Research and Educational Institutions etc. . The Contractors should enclose list of such offices with their addresses with the bid.							

8.	The authorized Bidder (other than OEM) must have successful executed minimum networking orders in any combination like 1 order of Rs. 20 Lacs and 2 orders of Rs. 15 Lacs each or atleast 3 orders of Rs 10.00 lacs each, during last 3 financial years for similar networking components. (Documentary proof with installation & acceptance of the same should be attached with offer issued by purchaser department.	
9.	OEM must have warehouse, sales, service staff in India	
10.	The bidder should not have been black listed, declaration as per the format given in Annexure-C provided.	Yes/No
11.	PAN No. and Service Tax Registration No.	PAN No. Service Tax No.
12.	Each Page of the tender document including all annexures duly stamped and signed by the bidder enclosed	Yes/No
13.	Validity of offer for 90 days.	Yes/No

In case any of the documents listed above are not attached with the technical bid, the bid shall stand disqualified/rejected and no correspondence in this regard shall be entertained.

Signature of authorized person

TENDER DOCUMENT

Sealed tenders on behalf of the Director, IIT Ropar are invited in TWO BID SYSTEM for Data Networking in at NIELIT campus of IIT Ropar as per detailed specification given in **Annexure “A”**

The offers addressed to “**The Registrar, Indian Institute of Technology Ropar**” and duly superscribed as “**Tender for Data Networking at NIELIT Campus**”, should reach in the Room No. 104, Registrar office, IIT Ropar, Nangal Road, Rupnagar by the due date and time. The technical bids shall be opened in the presence of the bidders whosoever may wish to be present. If the last date happens to be holiday, tenders will be opened on the next working day at the same time. The bids received after the due date and time will not be considered.

A) Instructions to Tenderers:

- a. ALL THE DOCUMENTS ENCLOSED SHOULD BE ARRANGED AND SUBMITTED IN THE SAME SERIAL ORDER AS THEY APPEAR IN THE TECHNICAL BID.
- b. Tender Bids to be submitted in two different envelopes.
 - 1st envelope superscribed as “Technical Bid for Providing Data Networking” should contain:
 - i) Tender fee of **Rs.500/-** in the shape of demand draft favouring, The Registrar, IIT Ropar payable at Ropar in separate envelop superscribing as Tender Fee.
 - ii) EMD of **Rs.50, 000/-** in the shape of demand draft favouring the Registrar, IIT Ropar payable at Ropar in separate envelop superscribing as EMD.
 - iii) Application form duly filled in and supported with the relevant documents of eligibility criteria and duly signed and stamped terms and conditions of the tender document.
 - c. 2nd envelope superscribed as “Price Bid for Providing **Data Networking at NIELIT Campus**” should contain the Price bid in the prescribed form.
 - d. All the envelopes to be sealed in a separate big envelop duly signed and superscribed as “Tender for Providing **Data Networking at NIELIT Campus**” should be deposited as per detail given above.
 - e. Tenders without Tender Fee and EMD prescribed above shall not be considered.
 - f. Conditional or incomplete tenders will not be accepted. Canvassing of any kind, direct or indirect, shall lead to disqualification of the bidder.
 - g. Tender in any form other than the prescribed form by IIT Ropar will be summarily rejected.
 - h. Revised/modified rates/offer after opening of the tenders will be summarily rejected and entire Earnest money deposit submitted with the tender will be forfeited.
 - i. Tenders with cuttings and over writings will be summarily rejected and the entire Earnest Money deposit submitted with the tender will be forfeited.
 - j. IIT Ropar reserves the right to accept or reject any or all or any part of the tender without assigning any reason thereof, and the decision of IIT Ropar in this respect shall be final.

Technical bids should contain list of items, quantity, make for each item. Price bid should contain the price of each item mentioned in the technical bid and the total value of the solution as per the above requirement. Price for the complete solution once quoted shall be final. In case of addition/deletion of work, the payment will be made as per the rates offered for each item. The quote should be complete in all respects i.e. all the items required for the complete solution should be taken into consideration, failing which the offer may be cancelled.

Evaluation Criteria: The technical evaluation shall be done on the basis of technical bids as referred above, the eligibility criteria documents as mentioned below and the compatibility of the proposed solution.

B) ELIGIBILITY CRITERIA AND TERMS & CONDITIONS:

1. One time importers with custom made specifications are highly discouraged.
2. The firm should have annual turnover of Rs.1 crore or above from businesses relating to sales and support for computers / Networking Systems, Computer Hardware in India during the last 2 years. Company should furnish copies of audited balance sheets for the last two years in support of annual revenue turnover or Certificates issued by Accounts Auditors.
3. The authorized bidder (other than OEM) should be in existence from last 5 years and should be in business of IT/Networking/Electronics/ Telecommunication/ during last 3 years in India.
4. The bidder should have similar experience of executing and maintaining LANs in Government Sector i.e. Public Sector Undertakings, Autonomous Bodies, Research and Educational Institutions etc. . The Contractors should enclose list of such offices with their addresses with the bid.
5. Bidder & OEM should not be blacklisted from any Govt./PSU/Central/State agency.
6. The authorized Bidder (other than OEM) must have successful executed minimum networking orders in any combination like 1 order of Rs. 20 Lacs.and 2 orders of Rs. 15 Lacs each or atleast 3 orders of Rs 10.00 lacs each, during last 3 financial years for similar networking components. (Documentary proof with installation & acceptance of the same should be attached with offer issued by purchaser department.
7. OEM must have warehouse, sales, service staff in India
8. For any line item no option will be accepted. The bidder is required to quote only one technically complied product against each line item. No option will be considered. Bidders are requested to mention the specific make & model no. of offered product against each line item.
9. All the equipment to be installed must bear reputed brands. If Bidder does not manufacture the equipment, bidders must submit proof of authorization from manufacturers. Manufacturer's test reports should also be supplied with all equipment. All accessories bundled by the manufacturer with the equipment should also accompany the equipment.

C) Performance Bond/Bank Guarantee:

a). The successful firm or his agent will be required to furnish a Performance Bank Guarantee (PBG) as per the format provided by the IIT Ropar for an amount equivalent to the 10% of work order value. The PBG shall be submitted on the satisfactory completion of job but before the releasing of 100% payment of work executed. The performance bank guarantee should be valid upto the warranty period plus three months on Active Components.

b.)The successful vendor ensure timely satisfactory installation and handing over the equipment in good working condition within the stipulated period and for carrying out after sales services during warranty period.

c). The EMD of successful bidder shall be refunded on the receipt of PBG.

In case of violation of any of the terms & conditions, the earnest money/PBG of the bidders shall be forfeited in full besides other actions.

D) Other Instructions

1. The offer should be legibly typed or handwritten in English with no cutting/overwriting.
2. Offers sent by e-mail/fax shall not be accepted.
3. Late tenders shall not be considered.
4. Warranty period: The warranty period will be as mentioned in the Technical Specification.
5. **Site Preparation:** The supplier shall inform IIT Ropar about the site preparation, if needed immediately after the receipt of the work order.
6. **Penalty for delay in supplies/Installation:** In the event of delay in supply of any material and completion of job:
 - a). The Bidder will inform IIT Ropar well in advance in writing the reasons for delay.
 - b). IIT Ropar shall have the right to recover liquidated damages at the rate of 1 % of the order value per week or part thereof, by which the supplies or their satisfactory installation and commissioning is delayed subject to a maximum of 10%. Once the maximum is reached, IIT Ropar may consider termination of the purchase order.
7. **Jurisdiction:**

The Courts of Rupnagar alone will have the jurisdiction to try any matter, dispute or difference between the parties arising out of this agreement/contract. It is specifically agreed that no court outside and other than Rupnagar court shall have jurisdiction in the matter.
8. **Force Majeure:**

Any failure of omission or commission to carry out the provision of this contract by the supplier shall not give rise to any claim by one party against the other, if such failure of omission or commission arises from an act of God; which shall include all acts of natural calamities such as fire, flood, earthquake, hurricane, or nay pestilence or from civil strikes, compliance with any statute and/or regulations of the Government, lockouts and strikes, riots, embargoes or from any political or other reason beyond the supplier's control including war (whether declared or not) civil war or stage of insurrection, provided that notice of the occurrence of any event by either party to the other shall be given within two weeks from the date of occurrence of such an event which could be attributed to Force Majeure conditions.
9. **Risk & Cost:**

In the event of failure to carry out the obligations, within the stipulated period or extended period of the work order for any reason, violation of warranties etc. the IIT Ropar shall have

the right to carry out the unfinished obligation at the exclusive cost and risk of the bidder/firm, after due notice and the difference so accrued shall be recoverable from the bidder/firm.

10. The Director, IIT Ropar reserves the right to accept/reject any or all offers without assigning any reasons thereof. He also reserves the right to reject the material, if the same is not found conforming to the specifications.

Registrar

Technical Specifications

Technical Specifications of Wireless Routers/ Access Points	
Features	Description
General Features	1200 Mbps Unified Simultaneous Dual Band Gigabit Access Point Integrated Internal Antennas to use as an access point, a wireless distribution system (WDS) with access point, a WDS/bridge, or a wireless client.
Advanced Features	Inbuilt DHCP Server ; Wi-Fi Multimedia (WMM) Quality of Service (QOS) data prioritization Multiple Input Multiple Output (MIMO) antenna technology; Wireless LAN segmentation and VLAN support; Internal RADIUS server; Web redirection
Ports	At least 1 x 10/100/1000Mbps Gigabit LAN port with POE Support
Security	WPA/WPA2 - Enterprise/Personal;WPA2 - PSK/AES over WDS;MAC address filtering; Network Access Protection (NAP)
	ARP spoofing prevention
Bandsteering	Load balancing with band steering to provide a faster and more stable wireless connection
Management	Should be manageable independently with free Central Wi-Fi Manager Controller Software upto minimum 500 APs.
Antennas	Two internal 3 dBi for 2.4 GHz • Two internal 4 dBi for 5 GHz
Mounting	Wall and ceiling mounting brackets to be included

Technical Specifications for Wireless Controller/ Manager (software only)	
Sr No	Description
1	Management features of controller
(a)	The Software based controller must support for management of IEEE 802.11a, IEEE 802.11b, IEEE 802.11g,IEEE 802.11n and 802.11ac Access points.
(b)	Support for management of at least 500 Access points or more without any license upgrade
(c)	Support for automatic channel and output power
	adjustment based on surrounding RF environment.
(d)	The Controller must be accessible from a Web-based user interface.
2	Access point management features
(a)	The controller must support L2 roaming across managed access points
(b)	The controller must support Band steering for managed access points.
(c)	The controller must be able to detect Rogue Access Points in the wireless network
(d)	The controller must be able to update the firmware of the managed access points.
(e)	The access point must provide Monitoring of connected clients giving information of each client for the connected SSID, MAC address, IP address and Authentication method.
(f)	The controller must have an inbuilt network topology visualization tool that gives an overview of the connected devices in the network including the clients connected to the access points.
(g)	Support for Web based authentication via captive portal
(h)	The controller must support the following authentication types- Local Database with username and password credentials, external RADIUS, LDAP, and passcodes.
(i)	The passcodes(Temporary passwords) created for guest authentication should have option be limited by time.

(j)	The controller must support for creation of list of at least 60 MAC address per SSID or more and allow access to only those devices - SSID based MAC authentication
(k)	Bulk upload of MAC address for authentication must also be supported.
(l)	Support for creation of multiple SSID's per Access Point.
(m)	The controller must be able to manage the bandwidth of the Wireless network and have option to limit the Uplink and downlink bandwidth on a per user and per SSID basis.
(n)	The configuration should have an option for scheduled update- update at a defined time and date.
(o)	The controller must support for mapping a VLAN to a particular SSID.
(p)	Port based VLAN support
(q)	syslog -system logs must be saved locally in the controller and must have option to export the logs to a system/PC.

24 Port SFP Switch (Type I)	
Features	Specification
	L2 Stackable Managed Switch which has
	16 SFP ports + 8 combo,10/100/1000BASE-T/SFP ports L2
	Switch should provide option of Redundant power supply
	The Switch should have 40 Gigabit Stacking Backplane
	The Switch should be able to do Physical Stack up to minimum 4 units per stack
	The Switch should be able to do IP Stacking up to minimum 30 units per IP
	The Switch should have IGMP Snooping v1,v2,v3 & MLD Snooping v1,v2
	The Switch should have Spanning tree 802.1d,802.1w,802.1s
	The Switch should have 802.3ad Link Aggregation Up to 30 groups per device
	The Switch should support 802.1AX Link Aggregation
	The Switch should support 8 Port Per Link Aggregation Group
	The Switch should have Port Mirroring One to one/Many to One & RSPAN
	The Switch should have the intelligence to detect the loop occurring from the unmanaged network segment
	The Switch should have the capability to build the trunk across stack
	The Switch should support IEEE 802.3ah, IEEE 802.1ag, 802.1AX & ITU-T Y.1731
	It should support 16 IP interfaces and 512 static routes for IPv4/v6
L2 Features	It should support IPv6 Neighbors Discovery
	The Switch should have at least 16 IP Interface
	The Switch should have ARP entries 2048
	The Switch should have IPv6 Neighbor Discovery (ND)
	The Switch should have ND entries 1024
	The Switch should have Routing Table Entry 512
	The Switch should have L3 Forwarding Entry 2048
	The Switch should have Weighted-Cost Multi-Path Route (WCMP)
L3 Features	Routing Table Entry -512
	L3 Forwarding Entry-2048
	The Switch should have Weighted-Cost Multi-Path Route (WCMP)
	The Switch should have Default route
	The Switch should have Static route
	L3 Routing
MAC Address	16K
	256 Static MAC Address
Switching Capacity	Min 80 Gbps
Max Forwarding Rate	Min 60 Mpps

Flash Memory:	Min 32 MB
SD RAM	Min 128 Mb
Packet Buffer	Min 2 MB for Non-blocking architecture
Jumbo Frame	Up to 13K
VLAN	The LAN switch should have IEEE 802.1Q VLAN encapsulation. Up to 255 VLANs per switch and up to 4000 VLAN IDs.
	Switch should have centralized VLAN Management. VLANs created on the Core Switches should be propagated to all the others switches automatically.
	It should have support for Detection of Unidirectional links and to disable them to avoid problems such as spanning tree loops
	It shall support 802.1v & Q-in-Q VLAN, Guest VLAN
QOS	It should support 802.1p Priority Queues (Min 8 Queues)
	Queue Handling mode: WRR ; Strict Mode &SPQ+WRR
	Class Map
	Class of Service (COS)
	Policy Map
	Remark 802.1p priority
	Time based QOS
	Congestion Control
ACL	Weighted Random Early Detection (WRED)
	The LAN Switch should have the capability to support access list based on IPv4/v6 address, Time based ACL, User-defined Access List, CPU Interface Filtering, MAC ACL
Security	The LAN switch should support IEEE 802.1x to allow dynamic, port-based, Host based security, providing user authentication
	The LAN switch should support for Admission Control features to improve the network's ability to automatically identify, prevent and respond to security threats and also to enable the switches to collaborate with third-party such as Microsoft for security-policy compliance and enforcement before a host is permitted to access the network
	It should support for SSHv2, SNMPv3; SNMP over IPv6 to provide network security by encrypting administrator traffic during Telnet and SNMP sessions.
	Switch should support ; Local database ;RADIUS authentication ; TACACS; TACACS+
	It should support DHCP snooping and to allow administrators to ensure consistent mapping of IP to MAC addresses.
	It should support port security to secure the access to an access or trunk port based on MAC address. After a specific timeframe, the aging feature should remove the MAC address from the switch to allow another device to connect to the same port.(up to 14 MAC-ID per port)
	It should have IP-MAC-Port binding up to 500 Entries per device
	It should have Web & MAC Based Access Control
	It should have CPU Filtering to protect the CPU from Broadcast / Multicast / Unicast flooding & protocol control packets attacks
Management	The LAN switch should have CLI support to provide a common user interface and command set with all routers and switches of the same vendor
	It should have RMON software agent to support four RMON groups for enhanced traffic management, monitoring and analysis
	It should support TFTP to reduce the cost of administering software upgrades by downloading from a centralized location.
	It should support Network Timing Protocol (NTP/SNTP) to provide an accurate and consistent timestamp to all intranet switches.
	It should support SNMPv1, v2c, v3 and Telnet interface to deliver comprehensive in-band management, and a CLI-based management console to provide detailed out-of-band management
	It should support configuration rollback to replace current configuration with any saved configuration file.
	Switch should consume less power through auto-detection of link status and cable length.

Technical Specification - 24 Port Managed POE Switch (Type II)

Features	Description
Model	10BASE-T/100BASE-TX/1000BASE-T: 24 POE
	1000BASE-X SFP Ports : 4

Switch Category	Gigabit Managed Switches
Performance	Switching Capacity: min 50 Gbps
	Max. Packet Forwarding Rate: min 40 Mbps or more
	MAC Address Table: min 16K and min 1.5 MB Packet Buffer
	Static MAC Entries : min 256 entries
Physical Features	Operating Temperature: -5 to 50 °C (23 to 122 °F)
	Power Supply: Internal AC Power Supply,
	Power Saving (Green)
Layer 2 Features	Spanning Tree (STP) 802.1d
	Rapid Spanning Tree (RSTP) 802.1w
	Loopback Detection
	Link Aggregation LACP 802.3ad: Up to 14 groups/8 ports per group
	Port Mirroring : One-to-One / Many-to-One
	Multicast Filtering
Layer 2 Multicast Features	Internet Group Management Protocol (IGMP) Snooping : v1 / v2
	IGMP Snooping Groups : 256
Virtual LAN (VLAN) Features	Tagged VLAN 802.1Q, 256 Static VLANs
	Auto Voice & Surveillance VLAN
Quality of Service (QoS) Features	No. of Queues : min 4 Queues per port
	Traffic Prioritization 802.1p
	Strict Priority
	Weighted Round Robin (WRR)
	Bandwidth Control: Port-based (Ingress/Egress, min granularity 10/100/1000 is 64 Kbps)
Access Control List (ACL) Features	Access Control List based on:
	• 802.1p priority
	• VLAN
	• MAC address• Ether type
	• IP address
	• Protocol type
	• TCP/UDP port number
	• IPv6 Traffic Class
Max. ACL Profiles / Rules: 50 / 768	
Security Features	Secure Sockets Layer (SSL) : v1 / v2 / v3
	Port Security: Max. min 64 MAC Addresses per Port
	Broadcast/Multicast/Unicast Storm Control
	DHCP Server
	ARP Spoofing Prevention
	In case of ARP Broadcast Storm, Virus Attacks switch should have ability to protect Control and Management Plane.
	Support 1 IP Interface & IPv6 Neighbor Discovery (ND)
	Switch should be able to identify unwanted traffic to CPU, prioritized and throttled from interrupting the smooth operation of the switch.

Technical Specifications of Passive Components

Category 6 UTP Cable
Category 6 Unshielded Twisted Pair 100W cable shall be compliant with EIA/TIA 568-C .2
Should be 4 pair, 23 AWG
Jacket: LSZH (Low smoke zero halogen)

Conductor: Solid Copper
All the Cat6 cabling components should be tested and verified by ETL with data transmission frequencies min 250 MHz or higher.
Should have performance warranty for 20/25 years
Cat 6 Information Outlet with Face Plate and Gang Box Complete
Category 6, EIA/TIA 568-C.2
Use insulation displacement connectors
All information outlets for 100 W, 22-24 AWG copper
Should have shutter on I/O
Should have Plastic Housing: Polycarbonate, UL94V-0 rated or equivalent
Contact Plating: 50 μinches gold over 100 μinches nickel
Operating Life: Minimum 200 Re-terminations
Single Gang square plate, 86mmx86mm
Plug in Icons – Icon tree – to be supplied with plate
Write on labels in transparent plastic window – supplied with plate
24 PORT CAT6 Jack Panel
Should Be made of cold rolled steel
Should conform to TIA / EIA 568-C.2 Component Compliant
Should confirm to EIA/TIA 568A wiring Pattern
Should have labeling strips for identification.
Patch Chords (1 meter, 3 meter and 5 meter length)
Should be 4 Pairs 24 AWG copper cables.
The Outer Jacket should be Low Smoke Zero Halogen.
24 AWG stranded bare copper
Should minimum comply with proposed ANSI/TIA/EIA-568-C.2
Should be verified by ETL (ETL certificate to be enclosed with the Bid)
UL listed (UL certificate to be provided along with the Bid)
Should have cross separator
SC LC Style LSZH Single mode 9/125 micron Duplex Patch Cord
Type SC to LC Duplex Fiber Optic Patch Cord Single Mode OS2 , 3 Mtr, 9/125 Micron
Cable Sheath LSZH
Ferrule Ceramic
Buffer Diameter 900 micron meter

FORMAT FOR NON BLACKLISTING OF SUPPLIER

I/ We _____Manufacturer/partner/Authorized Distributor/Agent (strike out which is not applicable) of (Supplier) _____ do hereby declare and solemnly affirm that the individual/firm/company is not black-listed by the Union/State Government/Autonomous body. Any partner or shareholder thereof is not directly or indirectly connected with or has any subsisting inters in business of my/our firm.

Signature

Address _____

I/ We hereby solemnly declare and affirm that the above declaration is true and correct to the best of my knowledge and belief. No part of it is false and nothing has been concealed.

Dated:

Signature

Price Bid**Networking BOQ**

Sr. No.	Description	UOM	QTY	Rate (Rs.)	Amount (Rs.)
1	Wi-Fi AP with Manager/controller (Software based)	Nos.	60		
2	24 Port Switch with min16 Port SFP (type I)	Nos.	1		
3	24 Port POE Switch with min 20 POE Port (type II)	Nos.	3		
4	Transceiver SM	Nos.	10		
5	Cat6 Cable 305m	Nos.	18		
6	Cat 6 Information Outlet with Face Plate and Gang-Box	Nos.	80		
7	Patch Panel Cat 6 UTP 24 Port- Loaded	Nos.	4		
8	Patch Cord Cat 6 UTP 1m	Nos.	85		
9	Patch Cord Cat 6 UTP 2m	Nos.	80		
10	6 Core Fiber Cable SM LSZH	mtrs	1500		
11	LC -SC OFC Patch Cords 3Mtrs LSZH SM	Nos.	8		
12	6 Port LIU Loaded rack mounted	Nos.	3		
13	24 Port LIU Loaded rack Mount	Nos.	2		
14	Fiber Joint Enclosures	Nos.	2		
15	Steel Wire	mtrs	1500		
16	RJ 45 Connector (Pack Of 100)	Nos.	2		
17	Pigtails Sc Type SM	Nos.	66		
18	9U (500mm depth) with 6X5amp PDU & Cable Manager	Nos.	4		
19	27U with (600X800mm) 6X5amp PDU & Cable Manager	Nos.	1		
20	PVC Pipe 1"/ 1.5" (As per actual)	mtrs	550		
21	Flexible Pipe 1.5" (As per Actual)	mtrs	100		
22	Soft/Hard soil digging(Laying of HDPE pipe through HDD machine, minimum depth of 2 meters), (As per Actual) Note: 2000 meters HDPE pipe and 6 Core OFC will be provided by IIT Ropar	mtrs	2000		
23	Fiber Cable Laying (On Wall Or Overhead), (As per Actual)	mtrs	1500		
24	Fiber Splicing (As per actual)	Cores	48		
25	Project Management charges (Including UTP Cable Laying, testing(fiber and LAN), PVC Pipe Laying, I/O Punching, Rack Mounting & Dressing, AP Mounting & Configuration of AP Manager)(Total LAN points require including WiFi points), Penta Scanning , OTDR of Fiber Cable	Nos.	1		

- All passive components should be from the same OEM except Racks and Gang Boxes
- Minimum 3 years warranty on Active and passive items from the date of satisfactory installation
- The billing of the services will be accepted as : As Per Actuals (APA)