



INDIRA GANDHI INSTITUTE OF TECHNOLOGY
Guru Gobind Singh Indraprastha University,
Kashmere Gate, Delhi – 110403.



NOTICE INVITING TENDER

Indira Gandhi Institute of Technology invites sealed tenders from reputed and eligible contractors/firms in two bid system (Technical & Financial) for the Supply and Installation of Lab Equipments and Lab Software in Electronics and Communication Systems Lab, Indira Gandhi Institute of Technology, Kashmere Gate, Delhi-110403. Tender Document contains details terms & conditions can be obtained from 10.00 a.m. to 03.00 p.m. upto 10.1.2013 from the office of Purchase Branch, Kashmere Gate, Delhi-110403 on payment of Rs.1000/- only through Demand Draft in favour of 'Principal, IGIT, Delhi'. Tender document can also be downloaded from University website i.e. www.ipu.ac.in. The downloaded tender document can be used by paying Rs.1000/- in the form of Demand Draft/pay order drawn in favour of 'Principal, IGIT, Delhi' to be enclosed with the filled in tender document (Technical Bid).

Duly completed tender document are to be dropped in the tender box at Purchase Branch, Kashmere Gate, Delhi-110403 latest by 01.00 p.m. on 10.1.2013. The tenders (Technical Bids) shall be opened at 4.00 p.m. same day i.e. on 10.1.2013 in the presence of tenderers or their representatives, if any. Incomplete tender documents shall not be considered and any alterations/cutting/overwriting in eligibility conditions in Technical Bid and in Financial Bid shall not be permitted .

(Charanjeet Kapoor)
Section officer, IGIT

**Cost: Rs. 1000/-
(Rs. One thousand only)**



INDIRA GANDHI INSTITUTE OF TECHNOLOGY
Guru Gobind Singh Indraprastha University,
Kashmere Gate, Delhi – 110403.

Name of Work: Lab Equipments and Lab Software in Electronics and Communication Systems Lab,
Indira Gandhi Institute of Technology, Kashmere Gate, Delhi-110403.

TENDER DOCUMENT

**Purchase Branch
Indira Gandhi Institute of Technology
Kashmere Gate
Delhi – 110 403
Contact Nos.: 23900280**

Total 23 pages

INDEX

Name of Work: Supply & Installation of Lab Equipments and Lab Software in Electronics and Communication Systems Lab, Indira Gandhi Institute of Technology, Kashmere Gate, Delhi-110403.

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INDIRA GANDHI INSTITUTE OF TECHNOLOGY

Guru Gobind Singh Indraprastha University,
Kashmere Gate, Delhi – 110403.

Tender Document

1. Name of work : Supply & Installation of Lab Equipments and Lab Software in Electronics and Communication Systems Lab, Indira Gandhi Institute of Technology, Kashmere Gate, Delhi-110403.
2. Last Date of Time for submission of tender : 10.1.2013 upto 01.00 p.m.
3. Place / Office for submission for Tender : Office of Purchase Branch, Indira Gandhi Institute of Technology Kashmere Gate, Delhi – 110 403.
4. Issued to : _____
5. Cost of Tender (Details)*
GGSIPIU Receipt No. : _____
Dated : _____
Amount : Rs. 1000/-
6. Date of Issue of Tender Document : _____
7. Signature of the officer issuing the document : _____
8. University Seal : _____

* In case Tender is down loaded from University website, then enclose a D/D drawn in favour of Principal, IGIT, Delhi, payable at Delhi at a time of submission of tender document.

**SECTION I
INFORMATION & INSTRUCTIONS FOR BIDDERS**

Earnest Money Deposit	Rs. 1,00,000/- (Rs. One Lakhs Only) In the form of DD/FDR in favour of Principal, IGIT, Payable at Delhi
Cost of Tender Form (Non-Refundable)	Rs. 1000/- (Rs. One thousand Only) through DD in favour of Principal, IGIT, Payable at Delhi
Completion period of the work	Maximum 60 days (Sixty Days) Supply & Installation to commence from 30 days.
Issue of Tender Document	upto 10.1.2013 on all working days from 10.00 AM to 04.00 PM. Tender Document may be purchased from Purchase Branch, Indira Gandhi Institute of Technology, Kashmere Gate, Delhi – 110403. OR Tender Document may be down loaded from the University Website.
Date and time of submission of Tender	10.1.2013 upto 1 P.M.
Opening of Technical bid in presence of the authorized representatives of bidders, if any.	04.00 PM on 10.1.2013 in the Conference hall , Indira Gandhi Institute of Technology, Kashmere Gate, Delhi – 110 403.

1.0 Introduction

- 1.1 The sealed item rate tenders are invited in two Bid System – (Technical & Financial Bid) on behalf of the Principal, Indira Gandhi Institute of Technology, Kashmere Gate, Delhi – 110403 from reputed & eligible agencies for “**Supply & Installation of Lab Equipments and Lab Software in Electronics and Communication Systems Lab, Indira Gandhi Institute of Technology, Kashmere Gate, Delhi-110403.**”

2.0 Scope

The work consists of: -

- 2.1 Supply & Installation of Lab Equipments and Lab Software in Electronics and Communication Systems Lab, Indira Gandhi Institute of Technology, Kashmere Gate, Delhi-110403 as per requirement given in **Section-III**.
- 2.2 Installation/fixing of Lab Equipments and Lab Software in Electronics and Communication Systems Lab, at the said location.
- 2.3 Comprehensive on-site **warranty** for a period of **36 months** from the last date of completion / installation for all the items supplied as certified by the Institute.

3.0 Definitions:

- 3.1 **IGIT** means Indira Gandhi Institute of Technology, Delhi
- 3.2 **Institute** means Indira Gandhi Institute of technology, Delhi
- 3.3 **Employer** means the Principal, IGIT and his successor
- 3.4 **Bidder** means the Manufacturer or his direct authorized distributor (dealing at first point), individual, proprietary firm, partnership firm, limited company private or public or corporation
- 3.5 “**Year**” means “Financial year” unless stated otherwise.

4.0 Who can apply:

- 4.1 If the bidder is a proprietary firm, the application shall be signed by the proprietor with his full typewritten name and the full name of his firm with its current address, Contact details etc.
- 4.2 If the bidder is a firm in partnership, the application shall be signed by all partners of the firm with their full typewritten names and current addresses, or alternatively, by a partner holding power of attorney for the firm. In the latter case a certified copy of the power of attorney should accompany the application. In both cases, a certified copy of partnership deed and current address of all the partners of the firm should accompany the application.
- 4.3 If the bidder is a limited company or a corporation, the application shall be signed by a duly authorized person holding power of attorney for signing the application accompanied by a copy of the power of attorney. The bidder should also furnish a copy of the Memorandum and Articles of Association duly attested by a Public Notary.
- 4.4 **Joint Venture/ Consortiums are not accepted.**

5.0 Sealing and Marking of Bids

- 5.1 The bidder shall place the Technical, Financial and Earnest Money Deposit marked as “**Technical Bid**,” “**Financial Bid**” and “**Earnest Money Deposit**” in three sealed separate envelopes (called inner envelopes). All the inner envelopes shall be placed in one sealed envelop called/ marked as **Outer Envelope**.
- 5.2 The sealed outer envelopes containing the EMD, Technical bid and Financial bid shall be addressed to Principal, Indira Gandhi Institute of Technology, Kashmere Gate, Delhi – 110403
- 5.3 The sealed tender shall bear the name and identification number of the Tender on the cover of the Envelope(s).
- 5.4 In addition to the identification required as above, **each** of the envelopes shall indicate the name and address of the bidder to enable the bid to be returned unopened in case it is declared late or is declared non-responsive.

6.0 Bid Submission:

- 6.1 The envelop named “**Technical Bid**” shall comprise of all documents as per **Clause-7**.
- 6.2 The envelope named “**Financial Bid**” and shall comprise of the price bids of the items included in **Section III**
- 6.3 Each page of the Technical Bid, Tender Document & Financial Bid must be sealed and signed by the authorized signatory of the bidder.
- 6.4 Duly signed tender document along with all corrigendum, addendum issued, if any, should also be sealed as part of technical bid.
- 6.5 Conditions other than those laid down in the Tender document will not be entertained.

7.0 Eligibility Criteria for Technical Bid

The formats/Annexure for the documents to be submitted, with Technical bid, are placed at **Section –II (Annexure – A, A1, A2 to Annexure E)**:

7.1	Letter of Transmittal	Annexure – A
	Declaration by Bidder	Annexure – A1
	Compliance to Bid Requirement	Annexure – A2
7.2	Organizational Structure: - Legal status of the company/ organization with legal proof along with copies of the original documents	Annexure - B
7.3	Income Tax Registration (PAN No.),	Attach self attested copies of the documents
	Service Tax Registration,	
	Vat Registration/ TIN Number	
7.4	Average financial turnover of Rs.1 Crore during the immediate last three consecutive financial years, duly audited, signed & stamped by a Chartered Accountant.	Annexure C
	The bidder should not have incurred losses in more than two years in the last 3 consecutive financial years, duly certified by Chartered Accountant, along with copies of audited profit and loss account of last three years	
7.5	Firm should have a authorized service centre in Delhi NCR only and should executed atleast 03 nos. of Similar Supply of Zeta Potential in India & Abroad in the last 03 years Explanation: “Similar Supply” means the work of Supply & Installation, installation of Lab Equipments and Lab Software in public sector undertaking, Govt. department, Educational Institutions, Research Institutional or in reputed private sector. This should be certified by an officer of the client organization on their letter-head.	Annexure D
7.6	An affidavit on Rs. 10/- (non-judicial stamp paper) declaring that the bidder/ organization has not been blacklisted/debarred by any of the government/ public sector agency in the last 3 years. A declaration of fair business practice by the Bidder.	Annexure – E
7.7	All items of the Tender must be quoted by the Manufacturer or his direct authorized distributor (dealing at first point), individual, proprietary firm, partnership firm, limited company private or public or corporation. Incomplete quote shall be summarily rejected.	
7.8	The Manufacturer should have a authorized service centre in Delhi NCR only	Attach copy of proof
7.9	No alterations/cutting/overwriting in Tender Documents shall be permitted.	

8.0 Evaluation Criteria:

8.1 The details submitted by the bidders will be evaluated in the following manner:

8.1.1 The “initial eligibility criteria” prescribed in para 7.0 to 7.8 above in respect of experience in similar class of works completed, financial turnover, profitability and valid registrations will first be scrutinized.

8.1.2 Evaluation of Financial bid.

8.2 Technical bid Evaluation:

8.2.1 Even though any bidder may satisfy the above requirements, he/she would be liable to disqualification if he/she has:-

8.2.1.1 Made misleading or false representation or deliberately suppressed the information in the forms, statements and enclosures required in the eligibility criteria document.

8.2.1.2 Record of poor performance such as abandoning work, not properly completing the contract, or financial failures/weaknesses etc.

Note : Only those Tenders who qualify Technical eligibility shall be consider for opening Financial Bid.

8.3 Opening of Financial bid and evaluation:

After the Technical evaluation of the bids, the University will open the 'Financial Bids' of all the bidders who have qualified in the Technical Eligibility Criteria as per Clause 7, at notified time, date and place in the presence of the qualified bidders or their representatives, if any. **The lowest financial bidder shall only be considered for award of work.**

The date and time of opening Financial Bid shall be intimated separately after deciding eligibility on evaluation of Technical Bid. The Financial Bid shall also be opened in the presence of Tenderers, if any, fulfilling Technical eligibility.

9.0 Earnest Money Deposit:

9.1 The Earnest Money Deposit (EMD) of **Rs. One Lac** must be attached (see Clause 5.1). The Earnest money shall be accepted with a minimum validity of 6 months in the following forms and shall be in favour of "Principal, IGIT", payable at Delhi:-

- i. Demand draft / Bankers cheque.
- ii. Fixed deposit receipt (FDR) .

9.2 Incomplete Tender Documents and Tenders with no earnest money deposit will summarily be rejected. In case of successful bidder of the financial bids, the earnest money will be returned after obtaining the required 10% Performance Security in the form of FDR alongwith the agreement on non-judiciary stamp paper of Rs. 100/-.

9.3 In the case of unsuccessful bidders, the Earnest Money Deposit will be refunded without any interest.

10.0 Financial Bid:

10.1 The bidder shall quote unit item rates in Indian rupees (INR), both in words and figures in the Schedule quantities only. No alterations/cutting/overwriting in the form of tender, in the schedule of quantities or additions etc. shall be permitted. In case of difference between the rates of items written in figures and in words, the rates of items written in words shall be taken as correct. No changes in unit rates shall be allowed. The rates quoted in schedule quantity are for finished and completed items and no extra amount for carting or transporting material, labour etc. shall be paid unless specifically so mentioned or provided for in tender. The rates should be inclusive of all leads and lifts for all materials in the completed items and also include all taxes, duties, royalties etc. including Work Contract Tax, labour cess, ESI, EPF etc. as applicable. No extra payment on this account will be made.

10.2 The Work Contract Tax/Turnover Tax/Income Tax shall be deducted at source at the rate that will be in force from time to time.

10.3 Terms of price shall be only in Indian rupees (INR) inclusive of duties, packing, forwarding, transportation, assembly, installation at Institute at Kashmere Gate, providing **36 months Warranty** (on site and comprehensive) for all items along with applicable taxes and levies.

11.0 General:

11.1 All information called for in the enclosed forms should be furnished against the relevant places in the forms. If for any reason, information is furnished on a separate sheet, this fact should be mentioned against at the relevant place. Even if no information is to be provided in a column, a "Nil" or "No Such Case" entry should be made in that column. If any particular/query is not applicable in case of the bidder, it should be stated as "not applicable". **The bidders are cautioned that Supply & Installation for incomplete information called for in the application forms or deliberate suppression of any information may result in the bid being summarily disqualified. Bids received after the expiry of the stipulated date and time mentioned in the tender document will not be entertained.**

11.2 The bid document should be legibly **written and serially numbered with proper tagging and binding**. The bidder should sign each page of the bid.

11.3 Overwriting should be avoided. Correction, if any, should be made by neatly crossing out, initialing with date and rewriting. Pages of the eligibility criteria document are to be numbered. Additional sheets, if any added by the bidder, should also be numbered. Bid should be submitted as a package with signed letter of transmittal.

- 11.4 References, information and certificates from the respective clients certifying suitability, technical knowledge or capability of the bidder should be signed by officer of the client organization with name & designation.
- 11.5 The bidder may furnish any additional information which he thinks is necessary to establish his capabilities to successfully complete the envisaged work. He is, however, advised not to furnish superfluous information. No information shall be entertained after submission of tender document unless it is called for by the Institute.
- 11.6 Any information furnished by the bidder found to be incorrect either immediately or at a later date, would render him liable to be debarred from tendering/taking up of any work in IGIT.
- 11.7 The successful bidder shall have to work in co-ordination and co-operation with any other agencies appointed by the Institute to work simultaneously in the same or adjoining area. The decision of the Institute in case of any dispute between the different agencies appointed by the Institute shall be final and a binding.
- 11.8 The bidder will have to enter into regular agreement **within 7 days** from the receipt of acceptance of the tender and shall abide by all the rules and regulations embodied therein.
- 11.9 Income tax, Works Contract Tax and any other tax at the rates in force during the progress of contract that will be in force from time to time shall be recovered / deducted from the released payment amount.
- 11.10 Sales Tax, purchase Tax, turnover tax or any other tax on material applicable on the date of submission of bid in respect of this contract shall be payable by the contractor and Institute will not entertain any claim whatsoever in respect of the same.
- 11.11 The bidder shall have to make his own arrangement at no extra cost to the Institute for water Supply & Installation, sanitation and electric Supply & Installation etc. at the site of work.
- 11.12 On acceptance of the tender, the name of the accredited representative(s) of the contractor who would be responsible for taking instructions from the Institute shall be communicated in writing to the Principal, IGIT.
- 11.13 The contractor shall furnish a list of Institute employees related to him, if any.
- 11.14 If the bidder shall obtain a contract with IGIT as a result of wrong tendering or other non-bonafide methods of competitive tendering, the Institute reserves the right to terminate the contract without any liability to the contractor.
- 11.15 Without prejudice to any of the rights or remedies under this contract if the contractor dies, the Institute shall have the option of terminating the contract without compensation to the legal heir of the contractor.
- 11.16 Escalation: Increase in rates of material / Labour shall not be payable on any account. Price quoted shall be firm and no escalation will be allowed on any account.
- 11.17 The successful bidder will have to sign an agreement within stipulated time period as mentioned in the letter of intent. The necessary fees, stamp paper, etc. required for completing the agreement have to be borne by the bidder.
- 11.18 **Scope of Works**
The Scope of work shall consist of fabrication and assembly for **Lab Equipment and Lab Software** including manufacturing, Supply & Installation, erection and placing in position at site, complete in all respects, and its maintenance during warranty period.
- 11.19 **Specification for Work and Quality**
The procurement of various materials shall be either from the manufacturers or their main authorized dealers to ensure that no duplicate/spurious makes are used in the works. The entire work shall be warranted for a period of three years against defective material with liability of replacement or to the satisfaction of the University.
- 11.20 **Safety and Security**
Safety and Security of workers/staff, material, equipments, etc. will be the responsibility of the contractor. The institute will not be held responsible on this account
- 11.21 The Institute reserves the right, without being liable for any damages or obligation to inform the bidder, to:

- (a) Amend the scope and value of contract to the bidder.
- (b) Reject any or all the applications without assigning any reason.

11.22 Any effort on the part of the bidder or his agent to exercise influence or to pressurize the University would result in rejection of his bid. Canvassing to any kind is prohibited.

12.0 Final decision making authority

The Institute reserves the right to accept or reject any bid and to annul the process and reject all bids at any time, without assigning any reason or incurring any liability to the bidders. No claim whatsoever will be entertained / paid by the university to the bidder (s).

13.0 Summary Rejection of tender:

13.1 The tenders not accompanied with Tender Fees and Earnest Money Deposit shall be summarily rejected. Similarly, if the bidder proposes any alternation in or additions to the prescribed form of tender or decline to carry out any work of the tender document; or any conditions mentioned, etc., his tender is liable to be rejected.

14.0 Particulars provisional

14.1 The Institute reserves the right to execute the work or reject the tender without assigning any reason or incurring any liability to the bidder.

14.2 The Institute has the power to make alteration in, omission from, addition of or substitution for the original specifications, drawings, designs.

14.3 Variation in the quantity of work order will be up to 30% from the proposed quantity and must be acceptable to the bidder for a period of one year from the date of acceptance of the work order.

15.0 Site visit

The bidder is requested to visit the work site and get acquainted with site conditions regarding layout and all other matters, affecting the work before filling in the item rates. Submission of a tender by a bidder, implies that they have read these instructions and have made themselves aware of the scope of the work, conditions of contract and Institute will not, therefore, bear any extra charges on any account, in case the bidder finds later on to have misjudged the site conditions or specification.

16.0 Amendment of tender document:

16.1 Before the deadline for submission of tender, the Institute may modify the tender document by issuing addenda.

16.2 Any addendum thus issued shall be a part of the tender document and shall be uploaded on the University website (www.ipu.ac.in). Prospective bidders must visit the website before filling and submission of Tender Document for such information.

17.0 Validity of Tender:

One hundred and Eighty days from the date of opening of tender. During this period no bidder shall be allowed to withdraw his tender. In case of withdrawal, the EMD submitted by the bidder shall be forfeited and no claim shall be entertained on this regard.

18.0 Performance Guarantee:

18.1 The Performance Guarantee of 10% of the total tendered value will be deposited by the tenderer within the 10 days after the letter of intent. The Performance Guarantee shall be accepted in the following form and shall be in favour of “**Principal, IGIT**”, payable at Delhi with a validity of months as under:-

- i. Fixed deposit receipt (FDR) of a nationalized bank (39 months validity)
- ii. Bank Guarantee(As per **Annexure-H**) (39 months validity)

- 18.2 The Performance Guarantee will be refunded without any interest after the successful installation and after three months of completion of warranty period.
- 18.3 In case of non submission of Performance Guarantee within specified time, the earnest money will be forfeited and the Institute may consider to black list/debarred the contractor.
- 18.4 In case a fixed deposit receipt/ Bank Guarantee of any bank is furnished by the contractor to the Institute as part of the Performance Guarantee and the Bank is unable to make payment against the said instrument. The loss caused thereby shall fall on the contractor and the contractor shall forthwith on demand furnish additional security to the Institute to make good the deficit.

19.0 Warranty

The bidder shall provide **36 months** Warranty (on site and comprehensive) on all items from the last date of installation and shall be responsible for any defects that develop in the **Lab Equipment and Lab Software**. They shall also replace any defective part of the product supplied and other accessories, without any exception and recourse, free of cost.

The bidder is responsible for all packing, unpacking, assembly, installation of units. The bidder will test the products and accomplish the adjustments necessary for successful and continuous operation of the products supplied at all installation sites and shall ensure maintenance of the supplied products during the warranty period. All the repairing / replacing of defects shall be done by the bidder totally free of cost.

20.0 Duration

The items covered under this tender are required to be delivered and installed at Indira Gandhi Institute of Technology at Kashmere Gate Delhi **within 60 days**, as specified in delivery schedule submitted by bidder. The Supply & Installation and installation is to commence 60th day after the issue of letter of Indent. The 60 days will start after 10 days from date of Issue of Letter of Indent by the Institute.

21.0 Payment Terms

Payment for Goods and Services shall be made by University in Indian Rupees as follows:

- 21.1 Payment shall be paid to the supplier after the complete Supply & Installation / installation as mentioned in the purchase order.
- 21.2 Each invoice should be submitted in duplicate clearly specifying contract no, goods description, quantity, unit price, total amount along with warranty certificate, etc.
- 21.3 No advance payment will be made under any circumstances.

22.0 Delay and Non Conformance

- 22.1 If the bidder fails to Install the Equipment with in the period specified in the Purchase Order, Institute shall without prejudice to its other remedies under the Purchase Order, deduct from the contract price, as liquidated damages, a sum equivalent to 0.5% of the contract price of the delayed goods weekly or part thereof of delay until actual delivery. The penalties will be maximum of 10% of the contract amount / awarded value.
- 22.2 In case of extraordinary delay or beyond 60 days of stipulated delivery period, Institute reserves the right to terminate the contract, without any liability to cancellation charges, forfeit/encash the submitted Performance Guarantee and blacklist/debarred the defaulting firm.

23.0 Services during warranty period

- 23.1 The maximum response time for maintenance complaint during warranty period (i.e. time required for bidder's maintenance engineer to report at the installation after a request call/telegram is made or letter is written) shall not exceed 01 day.
- 23.2 The period for correction of defects in warranty period is 03 days.

- 23.3 In case an item is not usable beyond the stipulated maximum downtime the contractor will be required to arrange for an immediate replacement.
- 23.4 In case the rectification of defects is not carried out within 03 days and replacement of defective items are not provided, a penalty of sum equivalent to 5% per week of the delivered price of that defective item(s) shall be levied. This penalty is applicable upto a maximum of 4 weeks (maximum 20%). Subsequently, the rectification shall be carried out by the University at the risk and cost of the contractor. The cost of repairs along with the penalty of 100% shall be recovered from the payment with held with Institute and the balance amount if any, will be paid to the contractor after completion of warranty obligations.

24.0 Packing and Marking

- 24.1 All packing should be strong enough to withstand rough handling during loading/ unloading and transporting. Fragile articles should be packed with special precaution and should bear the marking like Fragile, handle with care, This side up etc.
- 24.2 All protection and threaded fittings shall be suitably protected and covers shall block the openings.

25.0 Substitution and Wrong Supplies

Unauthorized substitution or materials delivered in error of wrong description or quality or supplied in excess quantity or rejected goods shall be returned to the contractor at contractor's cost and risk.

26.0 Insurance, Freight and Deliveries

- 26.1 The contractor shall make all arrangements towards safe and complete delivery at the designated locations indicated by Institute in the Purchase Order. Such responsibility on part of the contractor will include taking care of insurance, freight, state level permits etc. as applicable.
- 26.2 The contractor will keep Institute informed about changes, if any, in various stages of deliveries, installation.

27.0 Arbitration and Settlement of Disputes:

- 27.1 Institute and the contractor shall make every effort to resolve amicably by direct information negotiation by difference or dispute arising between them under or in connection with the Institute order.
- 27.2 If after thirty (30) days from the commencement of such informal negotiations, Institute and the contractor have been unable to resolve amicably the dispute, either party may require that the dispute be referred for resolution to the formal mechanisms as specified hereunder:
- 27.2.1 Any dispute or differences whatsoever arising between the parties out of or relating to the manufacturing, meaning, scope, operation or effect of this contract or the validity or the breach thereof shall be settled by arbitration in accordance with the provisions of the Arbitration & Conciliation Act, 1996 and the award made in pursuance thereof shall be binding on the parties. The sole arbitrator shall be appointed by the Vice Chancellor, GGS Indraprastha University.
- 27.2.2 The performance under this contract shall not stop for any reason whatsoever during the said dispute/proceedings, unless the contractor is specifically directed by Institute to desist from working in this behalf.
- 27.2.3 The venue of arbitration shall be Delhi/ New Delhi. The language of proceedings shall be English. The Law governing the substantive issues between the parties shall be the Laws of India. All disputes are subject to the jurisdiction of the Delhi Courts only
- 27.2.4 It is also a term of that if any fees are payable to the arbitrator, these shall be paid equally by both the parties. It is also a term of the contract that the arbitrator shall be deemed to have entered on the reference on the date he issues notice to both the parties calling them to submit their statement of claims and counter statement of claims.

28.0 Force Majeure

For purpose of this Clause, "Force Majeure" means an event beyond the control of the contractor and not involving the Contractor's fault or negligence and not foreseeable. Such events may include, but are not limited

to, acts of the University either in its sovereign or contractual capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargo.

If a Force Majeure situation arises, the contractor shall promptly notify the University in writing of such conditions and the cause thereof. Unless otherwise directed by the University in writing, the Supplier shall continue to perform its obligations under the Purchase Order as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

SECTION II

INFORMATION REGARDING TECHNICAL ELIGIBILITY (Annexure A to E)

LETTER OF TRANSMITTAL

From:

To

The Principal

Indira Gandhi Institute of Technology
Kashmere Gate,
Delhi

Sub: Submission of Tender Document for the work of “**Supply & Installation of Lab Equipments and Lab Software in Electronics and Communication Systems Lab at Indira Gandhi Institute of Technology, Delhi**”.

Sir,

Having examined the details given in Tender document for the above work, I/we hereby submit the relevant information:-

1. I/we hereby certify that all the statement made and information supplied in the enclosed annexure / forms accompanying statement are true and correct.
2. I/we have furnished all information and details necessary for eligibility and have no further pertinent information to Supply & Installation.
3. I/we submit the requisite certified solvency certificate and authorize the Principal, IGIT to approach Bank issuing the solvency certificate to confirm the correctness thereof. I/we also authorize the IGIT to approach individuals, employers, firms and corporation to verify our competence and general reputation.

Name & Signature(s) of Bidder(s) with seal

DECLARATION BY THE BIDDER

We _____ (Name of the Bidder) hereby represent that we have gone through and understood the Bidding Document (which in two parts) in Part-I (Commercial Section & Technical Section) and Part-II (Schedule of Quantities) and that our Bid has been prepared accordingly in compliance with the requirement stipulated in the said documents.

We are submitting a copy of Bidding Document marked “Original” as part of our Bid duly signed and stamped on each page in token of our acceptance. We undertake that Part-I and Part-II of the Bidding Document shall be deemed to form part of our bid and in the event of award of work to us, the same shall be considered for constitution of Contract Agreement. Further, we shall sign and stamp each page of this Part-I and Part-II as a token of Acceptance and as a part of the Contract in the event of award of Contract to us.

We further confirm that we have indicated prices in Schedule of Quantities and submitted in Price Bid in separately sealed envelope. We confirm that rate quoted by us includes price for all works/activities/supply etc. as mentioned in item description of the items in Schedule of Quantities.

SIGNATURE OF BIDDER : _____

NAME OF BIDDER : _____

COMPANY SEAL : _____

Note : This declaration should be signed by the Bidder’s representative who is signing the Bid.

COMPLIANCE TO BID REQUIREMENT

We hereby agree to fully comply with, abide by and accept without variation, deviation or reservation all technical, commercial and other conditions whatsoever of the Bidding Documents and Addendum to the Bidding Documents, if any, for subject work issued by IGIT.

We hereby further confirm that any terms and conditions if mentioned in our bid (Un-priced as well as Priced Part) shall not be recognized and shall be treated as null and void.

SIGNATURE OF BIDDER : _____
NAME OF BIDDER : _____
COMPANY SEAL : _____

ORGANISATION STRUCTURE

1. Name & Address of the Bidder :
2. Telephone No./Fax No./ e-mail :
3. Legal status of the Bidder (attach copies of original document defining the legal status)
 - a) An Individual
 - b) A proprietary firm
 - c) A firm in partnership
 - d) A limited company or Corporation
 - e) A Public Sector Undertaking
4. Particulars of registration with various Government Bodies (Attach attested Photo Copy)

Organization /Place of registration	Registration No
-------------------------------------	-----------------
5. PAN No. -----
6. Names and Titles of Directors & Officers with designation to be concerned with this work. :
7. Name & Designation of individuals authorized to act for the organization :
(Pl attach power of attorney in favour of authorized representative duly signed by authorized signatory)
8. Was the Bidder ever required to suspend work for a period of more than six months continuously after you commenced the construction? If so, give the name of the project and reasons of suspension of work. :
9. Has the Bidder, or any constituent partner in case of partnership firm, ever abandoned the awarded work before its completion? If so, give name of the project and reasons for abandonment. :
10. Has the Bidder, or any constituent partner in case of partnership firm, ever been debarred/ black listed for tendering in any organization at any time? If so, give details. :
11. Has the Bidder, or any constituent partner in case of partnership firm, ever been convicted by a court of law? If so, give details. :
13. Any other information considered necessary but not included above. :

(Stamp, Name & Signature of Bidder)

DETAILS OF ANNUAL TURNOVER

A. FINANCIAL DETAILS

Financial Years	Gross Annual Turnover on Supply & Installation of Lab Equipments and Lab Software (In Lakhs)	Profit/Loss (In Lakhs)
2010-2011		
2009-2010		
2008-2009		
2007-2008		
2006-2007		

B. Audited balance sheet and profit & loss account for above five years to be submitted.

(Stamp, Name & Signature of Bidder)

DETAILS OF SUPPLY OF LAB EQUIPMENTS AND LAB SOFTWARE IN LAST 03 (THREE) YEARS

Sl.No.	POSTAL ADDRESS OF CLIENT WITH CONTACT NUMBERS	STARTING DATE	SCHEDULED COMPLETION DATE	ACTUAL COMPLETION DATE	REASONS FOR DELAY, IF, ANY

(Stamp & Signature of Bidder)

DECLARATION FOR FAIR BUSINESS BY THE BIDDER

(Affidavit on Non-Judicial Stamp Paper of Rs.10/- duly attested by Notary / Magistrate)

This is to certify that We, M/s _____ in submission of this offer confirm that:-

- i) We have not made any misleading or false representation in the forms, statements and attachments in proof of the qualification requirements;
- ii) We do not have records of poor performance such as abandoning the work, not properly completing the contract, inordinate delays in completion, litigation history or financial failures etc.
- iii) Business has not been banned with us by any Central / State Government Department/ Public Sector Undertaking or Enterprise of Central / State Government.
- iv) We have submitted all the supporting documents and furnished the relevant details as per prescribed format.
- v) The information and documents submitted with the tender by us are correct and we are fully responsible for the correctness of the information and documents submitted by us.
- vi) We understood that in case of any statement/information/document furnished by us or to be furnished by us in connection with this offer is found to be incorrect or false, our EMD in full will be fortified and business dealings will be banned.
- vii) We have not been punished / penalized by way of imprisonment in last three years.
- viii) We have not been blacklisted/debarred by any of the Government/Public Sector Agency in last three years.

SEAL, SIGNATURE & NAME OF THE BIDDER

Signing this document

CHECK LIST FOR SUBMISSION OF BID

Bidder is requested to fill this check list and ensure that all details/documents have been furnished as called for in the Bidding Document along with duly filled in, signed & stamped checklist **with each copy of the "Un-priced bid (Part – I)"**.

Please tick the box and ensure compliance:

- 1 EMD
- 2 Bid Forwarding Letter
- 3 Power of Attorney in Favour of the person who has signed the bid on stamp paper of Appropriate value.
- 4 Partnership Deed in case of partnership firm and Article of Association in case of limited company.
- 5 Compliance to Bid Requirement
- 6 Declaration by the bidder
- 7 All pages of the bid have been page numbered in sequential manner.
- 8 Annexure(s) – A to E
- 9 Valid VAT, Service Tax, Excise Registration

SIGNATURE OF BIDDER : _____

NAME OF BIDDER : _____

COMPANY SEAL : _____

**Form of Performance Guarantee
Bank Guarantee Bond**

1. In consideration of the IGIT (hereinafter called “The Institute”) having offered to accept the terms and conditions of the proposed agreement between ----- and ----- (hereinafter called “the said Contractor(s)”) for the work ----- (hereinafter called “the said agreement”) having agreed to production of a irrevocable Bank Guarantee for Rs.----- (Rupees ----- only) as a security/guarantee from the contractor(s) for compliance of his obligations in accordance with the terms and condition in the said agreement.

We, ------(indicate the name of the Bank) ----- (hereinafter referred as “the Bank”) hereby undertake to pay to the Institute an amount not exceeding Rs.----- (Rupees ----- only) on demand by the Institute.

2. We, ------(indicate the name of the Bank) ----- do hereby undertake to pay the amounts due and payable under this guarantee without any demure, merely on a demand from the Institute stating that the amount claimed is required to meet the recoveries due or likely to be due from the said contractor(s). Any such demand made on the bank shall be conclusive as regards the amount due and payable by the bank under this Guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs.----- (Rupees ----- only).

3. We, the said bank further undertake to pay the Institute any money so demanded notwithstanding any dispute or disputes raised by the contractor(s) in any suit or proceeding pending before any court or Tribunal relating thereto, our liability under this present being absolute and unequivocal.

The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the Contractor(s) shall have no claim against us for making such payment.

4. We, ------(indicate the name of the Bank) further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be enforceable till all the dues of the University under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till Project-in-Charge on behalf of the University certified that the terms and conditions of the said agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this guarantee.

5. We, ------(indicate the name of the Bank) further agree with the University that the University shall have the fullest liberty without our consent and without affecting in any manner our obligation hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the University against the said contractor(s) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor(s) or for any forbearance, act of omission on the part of the University or any indulgence by the University to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).

7. We, ------(indicate the name of the Bank) lastly undertake not to revoke this guarantee except with the previous consent of the University in writing.

8. This guarantee shall be valid upto ----- unless extended on demand by the University. Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs.----- (Rupees ----- only) and unless a claim in writing is lodged with us within six months of the date of expiry or the extended date of expiry of this guarantee all our liabilities under this guarantee shall stand discharged.

Dated the ----- day of ----- for ----- (indicate the name of the Bank)

SECTION III

SCHEDULE OF QUANTITIES

FINANCIAL BID
(To be sealed separately)

Financial bid in respect of Supply & Installation of **Lab Equipments and Lab Software in Electronic and Communication** at Indira Gandhi Institute of Technology, Kashmere Gate, Delhi

S. No.	Items Specifications	Qty.	Unit Price	Amount in Rs. (inclusive taxes)
1.	<p><u>Optisystem Latest ver optical communication system design software complete suite (5 User).</u> <i>LITERATURE</i></p> <ol style="list-style-type: none"> Operator's Manual with full sample results for all experiments and exercises. Student Laboratory Manual describing the relevant background theory and experimental procedure. Comprehensive set of tutorial questions and solutions Additional Lecture Notes on Optical Waveguiding covering the principles of all the issues dealt with in the laboratory exercises CD with student literature (signed agreement required) 	01		
2.	<p><u>Wired communication system -</u> The Wireless Digital Communication Training System with SDR Platform should provide an interface to MATLAB Version 7.0 (R14) or above with Signal Processing, Communication and Instrumentation tool box through PC USB 2.0 and it should contain the following hardware units:</p> <ul style="list-style-type: none"> Base Unit with USB Interface for transfer of Data to & from the kit to the PC – 2Nos. Pluggable 70 MHz IF Module consisting of transmitter & receiver with SMA interface – 2Nos. The IF Module should have the facility for monitoring the data at the Baseband level and should provide facility for IF Loopback, Baseband Loopback and also IF & Baseband Full Duplex Communication. <p>Comprehensive set of experiment manual along with the MATLAB codes for the below mentioned experiments has to be provided. Apart from the experiments, the system should also allow the students to perform additional experiments & projects.</p> <p><u>Experiments to be covered :</u></p> <p>Base band Digital Communication Link (base band loop back)</p> <ul style="list-style-type: none"> Raised Cosine spectrum pulses Timing acquisition algorithm Clock tracking & slip control Matched filtering, Root raised cosine spectrum - Performance of Noise <p>Base band equalization techniques (Base band & IF)</p> <ul style="list-style-type: none"> Adaptive linear equalizer Adaptive decision feedback equalizer MSE convergence Decision aided channel tracking <p>Quadrature Modulation schemes (Base band & IF)</p> <ul style="list-style-type: none"> QPSK (Phase and frequency offset) Constellation plots Carrier recovery algorithm Carrier and Clock Tracking <p>GSM (Base band)</p> <ul style="list-style-type: none"> GMSK modulation & demodulation Viterbi equalizer for GSM <p>Basics of OFDM (Base band & IF)</p>	01		

	<ul style="list-style-type: none"> • Timing and Frequency synchronization • Channel estimation using FFT processing • Channel estimation using modified LS • Mean Square Error Performance <p>Basics of CDMA – DS (Base band & IF)</p> <ul style="list-style-type: none"> • Orthogonal and non-orthogonal spreading codes • Multipath channel estimation for Rake receiver • SER performance of RAKE combiner <p><i>LITERATURE</i></p> <ol style="list-style-type: none"> 1. Operator’s Manual with full sample results for all experiments and exercises. 2. Student Laboratory Manual describing the relevant background theory and experimental procedure. 3. Comprehensive set of tutorial questions and solutions 4. Additional Lecture Notes on Optical Wave guiding covering the principles of all the issues dealt with in the laboratory exercises 5. CD with student literature (signed agreement required). 			
3.	<p><u>Wireless communication system -</u></p> <p>The Wireless Digital Communication Training System with SDR Platform should provide an interface to MATLAB Version 7.0 (R14) or above with Signal Processing, Communication and Instrumentation tool box through PC USB 2.0 and it should contain the following hardware units:</p> <ul style="list-style-type: none"> • Base Unit with USB Interface for transfer of Data to & from the kit to the PC – 2Nos. • Pluggable 70 MHz IF Module consisting of transmitter & receiver with SMA interface – 2Nos. • The IF Module should have the facility for monitoring the data at the Baseband level and should provide facility for IF Loopback, Baseband Loopback and also IF & Baseband Full Duplex Communication. • 2.4GHz RF Module – 2 Nos. <p>Comprehensive set of experiment manual along with the MATLAB codes for the below mentioned experiments has to be provided. Apart from the experiments, the system should also allow the students to perform additional experiments & projects.</p> <p>Experiments to be covered :</p> <p>Base band Digital Communication Link (base band loop back)</p> <ul style="list-style-type: none"> • Raised Cosine spectrum pulses • Timing acquisition algorithm • Clock tracking & slip control • Matched filtering, Root raised cosine spectrum - Performance of Noise <p>Base band equalization techniques (Base band & IF)</p> <ul style="list-style-type: none"> • Adaptive linear equalizer • Adaptive decision feedback equalizer • MSE convergence • Decision aided channel tracking <p>Quadrature Modulation schemes (Base band & IF)</p> <ul style="list-style-type: none"> • QPSK (Phase and frequency offset) • Constellation plots • Carrier recovery algorithm • Carrier and Clock Tracking <p>GSM (Base band)</p> <ul style="list-style-type: none"> • GMSK modulation & demodulation • Viterbi equalizer for GSM <p>Basics of OFDM (Base band & IF)</p> <ul style="list-style-type: none"> • Timing and Frequency synchronization • Channel estimation using FFT processing • Channel estimation using modified LS • Mean Square Error Performance <p>Basics of CDMA – DS (Base band & IF)</p> <ul style="list-style-type: none"> • Orthogonal and non-orthogonal spreading codes 	01		

	<ul style="list-style-type: none"> • Multipath channel estimation for Rake receiver • SER performance of RAKE combiner <p><i>LITERATURE</i></p> <ol style="list-style-type: none"> 6. Operator's Manual with full sample results for all experiments and exercises. 7. Student Laboratory Manual describing the relevant background theory and experimental procedure. 8. Comprehensive set of tutorial questions and solutions 9. Additional Lecture Notes on Optical Wave guiding covering the principles of all the issues dealt with in the laboratory exercises 10. CD with student literature (signed agreement required). 			
4.	<p><u>Experimental OTDR Setup(Modular):-</u> Consisting with the following items <u>LED module with Power Supply:</u> LED Peak Wavelength - 880nm, Spectral Bandwidth: 30nm, Max Optical Power Coupled into Plastic Fiber > -20dBm, Forward Bias. <u>PD Module with Power supply :</u> Photo detector - Silicon PIN Diode, Responsivity at 880 nm -0.4 $\mu\text{A}/\mu\text{W}$, Reverse Dark Current -60nA, Forward, Reverse & Zero Bias, Leakage characteristics. <u>LASER DIODE module with power supply for Characteristics & Free Space set-up :</u> Wavelength - 660nm (typ.), Max O/P power - 3mW, Threshold current - 30mA(typ.), Forward Bias, Collimating lens for adjustable spot size. <u>LD Modulator:</u> Max data rate – upto 34Mbps for NRZ. <u>Optical Receiver :</u> Modulated Optical I/P - 4Mbps for NRZ. <u>APD Module with power supply:</u> Photo detector - Silicon Avalanche Photo Diode, Max Reverse Current - 100μA, Responsivity at 850 nm (At M=1) - 0.45 $\mu\text{A}/\mu\text{W}$, Multiplication factor – 100 (typ), ST type optical connector interface.</p> <p><u>OTDR Building Blocks:</u></p> <ol style="list-style-type: none"> i) Directional Coupler 1x2, 50/125micron – 1No., ii) XY positioner, mounting post for LD unit with Rail, iii) LD & APD module as specified above , iv) Pulse Generator unit – less than 150ns ON time with RS422 interface, v) 1m ST-ST patch cord – 2Nos., vi) Min 500m of MM GF in different lengths with Events to study the OTDR concepts. <p><u>Optical Fiber Communication Trainer with power supply :</u> <u>Facility to bypass the communication block and to add the circuitry</u> Electrical Section: 12 (64Kbits/sec) channels, including one slot for 16-bit Marker, User programmable two 8-bit frame markers in the alternate frame, Manchester Coding / Decoding, Data Rate - 768 Kbits/sec, 1.5 Mbits/sec after Manchester coding, 2 Voice PCM channels, A-law Voice coding. <u>Optical Section :</u> LED Operating Wavelength - 850nm & 650nm, Detector - Si PIN Photo Diode, FWHM Spectral Width - 100nm, Fiber - 1000micron plastic Fiber(1m & 3m length) Additional Features: Expansion ports, Programmable marker</p>	02		

	<p>settings, Single & Double marker for False marker study, Latch type data switches for '1' or '0' transmission, Provision for feeding TTL thru' these data switches & Complete functional block diagram showing different stages with test points and BNC ports for all I/O operations should be available. Analog and Digital Link</p> <p><u>MM Fibere characteristics-</u> MM GF Reference patch cord , Loose jacketed MM Glass fibre with fixed mandrel, Mandrels with different diameter for MM GF Bending loss measurement</p> <p>List of Experiments to be performed with Experimental OTDR</p> <ol style="list-style-type: none"> 1. Setting up fiber optics analog link & digital link. 2. Study of propagation loss in optical fiber 3. Study of bending loss 4. Measurement of Numerical aperture 5. Characteristic of fiber optical communication link 6. Measurement of propagation loss & optical power loss in optical fiber power meter 7. Characteristics of F.O. communication Link 8. Measurement of power using Optical Power Meter 9. Setting of Fiber Optic Voice Link 10. Characteristics of a laser diode a) Optical Power Output vs LD Forward Current. b) Monitor Photodiode Current vs Operation. 11. Setup the line of sight link with laser 12. Design and Evaluation of LD digital transmission system. 13. Transmission of Laser through an Optical Fiber. 14 Study of Multimode Fiber Characteristics 15. Measurement using with Experimental OTDR. 16. Fault Finding with experimental OTDR 17. Photo Diode Characteristics 18. Avalanche Photo Diode Characteristics 19. LED Characteristics 20. study of Manchester coder <p><i>LITERATURE</i></p> <ol style="list-style-type: none"> 1. Operator's Manual with full sample results for all experiments and exercises. 2. Student Laboratory Manual describing the relevant background theory and experimental procedure. 3. Comprehensive set of tutorial questions and solutions 4. Additional Lecture Notes on Optical Wave guiding covering the principles of all the issues dealt with in the laboratory exercises 5. CD with student literature (signed agreement required) 			
5.	<p><u>Optical Power Meter:</u> Calibrated wavelength – 660nm/850nm, Optical I/p Power : +3dBm to -60dBm, Accuracy : ± 0.2dB , Battery & DC power operation, Optical Interface for PF (Bare fiber Adapter) & MM GF (ST Type).</p>	04		
6.	<p><u>Optical Power Source:</u> Optical Source Type – LED, Wavelength - 880nm, Spectral Width - 100nm, Max optical o/p: -20dBm, Output Stability: <0.3dB, Optical Connector - ST type,</p>	04		

	Attenuation by Coarse & Fine Adjustments.			
7.	BER Module For BER Calculation	02		
8.	<u>Wavelength Division Multiplexer-Chromatic Dispersion – (Modular)-</u> Two lase diode sources of wavelengths 1310 nm and 1550 nm Laser Diode Detectors-1 No. Each Laser Diode Driver WDM/DWDM Couplers-2 No. Pattern Generator-1 Set Single mode glass fiber-2.5Km Power Meter 850/1300/1550nm 1. The experimental setup includes two laser sources of different wavelength with a sufficient length of fiber cable 2. WDM: Utilization of both 1310nm and 1550nm wavelength for transmitting electrical signals simultaneously over a single fiber can be demonstrated 3. CD: With the help of a narrow pulse generated, the delay effect of chromatic dispersion can be seen on the oscilloscope 4. Wavelength Division MUX concept 5. Chromatic Dispersion effect – delay in a single mode fiber – due to 1310nm and 1550nm wavelength 6. Laser Diode characteristics – 1310nm and 1550nm <i>LITERATURE</i> 1. Operator’s Manual with full sample results for all experiments and exercises. 2. Student Laboratory Manual describing the relevant background theory and experimental procedure. 3. Comprehensive set of tutorial questions and solutions 4. Additional Lecture Notes on Optical Wave guiding covering the principles of all the issues dealt with in the laboratory exercises 5. CD with student literature (signed agreement required)	01		
9.	Digital Storage Oscilloscope Bandwidth : 100 MHz, No. of Channels: Two, Display : Colour	4		
10.	<u>LAN-Trainer with Open Source Platform-6 Nodes</u> (PCI Version) ➤ Comprehensive set of experiments to observe and measure the behavior of several LAN protocols ➤ MAC layer: ALOHA, CSMA, CSMA/CD, Token BUS and Token Ring ➤ Data Link Layer: Stop & Wait and Sliding Window (Go-back-N) ➤ Application layer: FTP ➤ User configurable data rates - 8, 16, 32, 64, 128, 256, 512kbps and 1Mbps. ➤ Generation of bit errors and frame errors between 2 nodes - upto 10^{-6} ➤ Variable network size - upto six nodes with each NEU using 3 PCs ➤ Emulation of two nodes by each PC - reduces the number of PCs required and realistic to experiment with minimum number of PCs ➤ Emulates propagation delay between nodes through user settable bits - 0 to 15bit delay ➤ Allows experimentation using the software provided; source code included for better understanding and modifying them as suggested in exercises under each topic in user manual ➤ Software allows changing key parameters that dictates the network behaviour: ➤ Packet size - upto 1000bytes ➤ Inter-packet delay (average packet arrival time) - configurable	01		

	<p>in milliseconds</p> <ul style="list-style-type: none"> ➤ Menu driven user interface to experiments - Acts as a shell to all experiments and avoids user programming the user interface and the main window. Allows user to concentrate only on the algorithm ➤ Comprehensive manual - suitable for both lab instruction as well as self-study. <p>Network Emulation Unit (NEU): Data Rates: 8, 16, 32, 64, 128, 256, 512Kbps, 1Mbps Delay: 0 to 15 bit between each node Error generators: (between one pair of nodes) Bit error: 0 to 10⁻⁶ Frame error: 0 to 10⁻⁵</p> <p>Network Interface Unit (NIU): PC plug-in card: 32 bit, 33MHz PCI bus (PCI ver2.0 compliant) MAC Layer support: ALOHA, CSMA, CSMA/CD, Token Bus, Token Ring Nodes: 2 nodes per NIU</p> <p>Experiment Software:</p> <ul style="list-style-type: none"> ➤ LAN trainer shell - provides a menu driven interface to the experiments. ➤ 'C' library - Programming interface to the NIU ➤ Stand-alone programs for Level 1 experiments. Source code provided for study and analysis; re-use for level 2 experiments ➤ Configuration - To setup network and other experiment parameters ➤ Statistics window displaying the NIU parameters like transmitted packet count, received packet count, collisions count, CRC errors, frame errors etc., while experiment is running ➤ Save option to save the NIU statistics - to use with equations for analysis. Saves in CSV format to work with MS Excel. ➤ Display of experiment activities and other results in the application window - to use with equations for analysis. Variable network size up to 6 nodes with each network emulation unit. ➤ Emulation of two nodes by each PC reduces the no: of PC required and realistic to experiments with minimum no.: of PCs. <p><i>LITERATURE</i></p> <ol style="list-style-type: none"> 1. Operator's Manual with full sample results for all experiments and exercises. 2. Student Laboratory Manual describing the relevant background theory and experimental procedure. 3. Comprehensive set of tutorial questions and solutions 4. Additional Lecture Notes on Optical Waveguiding covering the principles of all the issues dealt with in the laboratory exercises 5. CD with student literature (signed agreement required) 			
Total Amount in Rs. (taxes inclusive)				

Note: Rates should be quoted inclusive of all taxes in Indian Rupees