MAHARSHI DAYANAND UNIVERSITY ROHTAK

TENDER NOTICE

Sealed tenders superscribing as "Tender for ECE Lab Equipments" are invited for the purchase of equipments for UIET latest by 09.11.2010 alongwith Earnest money @ 2% of involved value as demand Draft favouring Finance Officer, M.D. University, Rohtak. For details may visit University website www.mdurohtak.com . Tenders will be opened on 10.11.2010 at 3.00 p.m. in the office of the Director, University Institute of Engineering & Technology.

REGISTRAR

UNIVERSITY INSTITUTE OF ENGINEERING & TECHNOLOGY
MAHARSHI DAYANAND UNIVERSITY ROHTAK
TERMS & CONDITIONS OF THE TENDER FOR SUPPLY OF LAB EQUIPMENT FOR ECE LAB

The articles/material as per specification given overleaf/attached is to be purchased for this Institute. You are requested to kindly quote your rates for the same. The following terms and conditions for quoting the rates may kindly be kept in view while you do so:-

1. All charges payable by the University should clearly be stated.
2. Sealed quotations/tender should be addressed to the Director, UIET, M.D.University, Rohtak and reach the office of the undersigned on before09.11.2010 quoting our reference and due date of opening on the envelope.
3. The quotation/tender should be submitted only if the material is available in you ready stock or can be supplied within 15 days after the order is placed.
4. The quotation/tender will be opened in the office of the undersigned on 10.11.2010 at 3.00 p.m.in the presence of the parties or their representatives who so ever like to be present.
5. An amount of 2% of quoted amount only in the shape of Bank Draft in favour of Finance Officer, M.D. University, Rohtak as earnest money should accompany the quotation/tender in absence of which the tender/quotation will not be entertained.
6. Tender received without earnest money or after the due date shall not be entertained except with the special approval of the Registrar.
7. As far as possible the rates should be quoted for the make and specification of the items given. In case any alternative/equivalent item is offered its specifications and leaflets may be sent with the tender/quotation. The sample of material should accompany the tender/quotation for record.
8. Guarantee/warranty period for equipments should be clearly specified /mentioned.
9. 100% payment will be made on receipt and inspection of goods/items to ensure the specifications and their good condition by the inspection Committee.
10. Dispute, if any, will be subject to Rohtak jurisdiction.
11. The University reserves the right to reject any or all quotation/tenders without assigning any reason thereof.
12. If your rates are approved by the DGS&D and other Central/State Agency, the rates of the same must be quoted and the copy of the rate contract be attached.
13. Tender must be submitted by Either Manufacturer or their authorized dealer/Distributor. Authorization letter in proper format must be attached with tender otherwise Bids will not be considered. Authorization letter should be on letter head of Manufacturer and should be signed & stamped. Tenders from dealers will be rejected without proper authorization letter from the manufacturers.
14. In case the contractor backs out of his contract, the earnest money deposited by him shall be forfeited besides any other action as may be considered necessary by the Vice-Chancellor.

DIRECTOR (UIET)

Specification of the Instruments

Sr No	Name of item with specification	Quantity
1	**Satellite Communication Trainer** **Features:** Simultaneous communication of three different signals Communicate Audio, Video, Digital data, PC data, Tone, Voice, function generator waveforms etc. 2414 - 2468 MHz PLL microwave operation Communication of external broad band digital signal Choice of different transmitting and receiving frequencies Built-in Speaker and Microphone for Voice and Audio link Remote detection of Light intensity and environment temperature Detachable Dish Antenna at each station **Technical Specification:** **Uplink Transmitter:** Transmitter with selectable frequency conversion 2450-2468 MHz up-linking selectable frequencies Wide band RF amplifier. No manual matching required. 16 MHz Bandwidth Frequency select switch and LED indication. FM Modulation of Audio and Video. Coverage area 35m Indoor and 80m outdoor Transmit Audio, Video, Digital data, PC data, Tone, Voice, function generator waveforms etc. Separate section for telemetry operation. Inbuilt Tone generator: Frequency: 100Hz to 1 KHz. Amplitude: 0V to 1Vpp. Separate terminals provided for different inputs. Interface : USB interface for PC-PC communication Power Supply: 230V AC ±10 %, 50 Hz. **Satellite Link:** Transponder with selectable Uplink and downlinks frequency conversion. Light and Temperature sensors for telemetry operations. Delay knob provided for simulated Transition delay experiment. Optional Solar power supply for Transponder Unit. Detachable Dish Antennas. Power Supply: 230V AC ±10 %, 50 Hz. **Downlink Receiver:** Receiver with selectable frequency conversion. Receives and demodulate three signals simultaneously. Built in speaker for audio and video output. Detachable Dish Antenna. Interface : USB interface for PC-PC communication Power Supply: 230V AC ±10 %, 50 Hz. Accessories: 14" Colour TV & VCD Player for Audio & Video Transmission With Necessary Video & data cables	2
2	**CDMA Training system** **DSSS modulation & demodulation** **FHSS Modulation & demodulation** **Codes: gold code, MLS code, & Barker**	2

	Module 1	
	Direct Sequence Spread-Spectrum (DSSS) Mod., Demodulator Programmable chip rates upto 10 M chi p / s Spreading codes : 23 Gold sequences (up to 2 -1 chips) Maximal length sequences (max23 length 2 -1 chips) Barker codes (length 11,13) Code modulation: BPSK / QPSK / OQPSK with output spectral shaping filter : Raised cosine square root filler with 20 %, 25 %, or 40 % rolloff Internal generation of pseudo-random bit stream and unmodulated carrier for test purposes Built-in channel impairments generation : 1. Additive White Gaussian Noise 2. Frequency offset (Doppler) Sequential code search 4-bit soft-quantized demodulated bits Extensive monitoring : Receiver lock, Carrier frequency error On Board Facility for Audio communication using DSSS. On board test points with LED indication should be provided for chip rate,clock freq ,I & Q channel etc. **Power Supply :** 220 V ±10%, 50 Hz / Standard Accessories User freindly Windows based Software CD-Rom Serial interface cable, Microphone & Headphone. **Module 2** Data rate : 16Kbps, 8 Kbps, 4Kbps World Length : 8 bits Data Format : NRZ (Non Return to Zero) PN Sequence Generators Chip Clock : 240, 120, 60, 16 ,8, 4KHz. Sequence type : Maximal length sequence Sequence patterns : Selectable through feedback taps in LFSR. BFSK frequencies : 100 KHz for mark and 50 KHz for space Frequency synthesizer O/P : Sinusoidal Freq. synthesizer frequencies : 1.6 &,1.4MHz, 800& 400 KHz, Hopping channels : Four No. of hops/data period :variable(selectable for slow/fast hopping) Interconnections : 2mm socket Power Supply : ± 5V, ± 12V DC, 200mA Test Points : 36 Mains supply: 230V Ac/50Hz	
3	**MSK Modulation / Demodulation Trainer** Major blocks : - Digital data generator - Sine and Cosine wave generator for wave shaping - Sine and Cosine carrier generator - Clock signal generator - MSK modulator and Demodulator sections **Technical Specifications** Power supply : 230 V, 50 Hz Data Source Data rate : 8 Kbps World Length : 8 bits Data Format : NRZ (Non Return to Zero) Clock Source : 8 KHz, 4 KHz	2

	Carrier Generators : 25 KHz (Sinusoidal) Pulse Shaping Waveform : 4 KHz Interconnections : 2 mm socket Power Supply : ± 5 V, ± 12 V DC, 200 mA Test Points : 36 **Trainer should be encased in a plastic molded box ,with no components on the top only block diagram should be provided on top of trainer**.	
4	**GSM Trainer with application Module** Trainer with facility to insert SIM card , Study of AT commands in GSM Windows based software to study & apply commands in real time. Command concerning modem & sim card hardware - Network registration commands - Call control command - Call setting commands - Call information commands - Phone Book commands - Serial link control commands - Message setting commands Interface : RS 232/USB **Included Accessories** Power adapter - 9 V / 500 mA,RS - 232 /USB cable GSM Antenna (900/1800) and cable (30 cm.) with coaxial plug Handsfree kit,software CD . Application Module: Application module with a light bulb & interface .tostudy switching ON/OFF light bulb & appliances using a SMS. **Trainer should be encased in a plastic molded box ,**	2

5	**60 MHz Digital storage Oscilloscope with Colour Display**
	
	No of channels : 02
	Bandwidth : 60 MHz
	Real time sampling rate : 500 MS/s
	Eq. time sampling rate : 50 Gs/s
	Rise time : 5.8 ns
	Memory depth : 4K.
	Time base : 5 ns/div- 50 s/div
	Horizontal Accuracy : ± 0.01 %
	Trigger mode : Edge, TV, Pulse, DC,AC,HF,LF
	Vertical sensitivity : 2 mV/div to 5V/div
	Vertical resolution : 8 bit
	Coupling : AC/DC/Gnd
	Input impedance : 1 MΩ in parallel with 13 pf
	Cursor : Manual, Track & auto measure mode.
	Mathematical Function : Add, Subtract, Multiply ,divide & FFT
	FFT window : Hamming,Hanning,Blackman &
	                                   Rectangular Sample: 1024 points
	Internal Storage : 10 waveforms & 10 setups
	Auto Measurements :Vpp,Vmax,Vmin, Vtop,Vbase,Vamp,
	                                   Vrms,Vavg,Vpre, Vover, Frequency,
	                                    Time period,risetime,falltime,
	                                     +ve width, -ve width, +ve duty cycle,
	                                    -ve duty cycle , delay A & delay B.
	Interface : USB device,
	Display : 320 X 240 colour LCD
	Power : 100V- 240VAC,50 Hz
		2

	Accessories : USB data cable, software, Mains chord ,10: 1 probes – 2nos		
6	**Optical Communication Trainer with WDM** **Light sources**: FP-LD 1310- 1550nm Built in optical isolator MQW-FP Laser diode module InGaAs monitor pin photodiode. 10/125µm single mode fiber pigtail with SC-PC connector Optical output power: 10 mW max. Visible LED wavelength: 650 nM **Optical detector:** InGaAsP Pin PD – SM @ 1.55 µm Low dark current, low capacitance **Digital control**: FPGA: EPIK100QC208-3 (Altera)1,00,000 Logic gates SRAM: 256K X 16 15 nS. Low speed ADC: 8-Channel ,12 bit 200KSPS ADC High speed ADC: 1-Channel ,12 bit 20 MSPS ADC Serial DAC: 8 channel 12 bit 1 µS DAC. **Signal input** : Built in function Gen: 10 Hz to 50 KHz ,0- 5VPP , Sine, square, Triangle, User Digital, user analog, PCM signal. **Signal out Connector** : BNC,RCA,RS232, Parallel, mini Jack Power supply: 85- 264 Vac /50 Hz **Built in Devices**: Visual attenuator, Fixed Attenuator, WDM set, V groove, Hybrid adapter set, optical test set		2
7	**Fiber optics connectrization & splicing kit.** 1. Crimp Tool : 1 2. Red No Nike tool : 1 3. Jacket Stripper : 1 4. Scissors : 1 5. Diamond Scribe : 1 6. Polish Films : 1 Pack 5u lu 0.3u (3 each) 7. 2 Part Epoxy : 3 Packs 8. Syringe & Needle : 3 Packs 9. Polishing Disc (ST) : 1 10. Polishing Pad : 1 11. Work Mat : 1 12. Glass Plate : 1 13. Measuring Scale : 1 14. Cable Markers : 1 Pack 15. Knife : 1 16. Tweezers : 1 17. Screw Driver : 1 18. Marker Pen : 1 19. Tissue Papers : 1 Pack 20. Alcohol : 1 Pack 21. Foam Swabs : 1 Pack 22. Piano Wife : 1 23. X100 Microscope : 1		2

24.	Continuity Tester	:	1
25.	ST Connectors	:	10
26.	Glass Fiber Cable 62.5/1 25	:	25 meters
27.	suitcase type packing case	:	1
28.	Storage Boxes	:	6
29.	Ultra Splice (mechanical)	:	02

30. simulation & teaching software for : single user
Optical communication with Hardware
USB Lock,
31. Optical fiber sample display (5 types) : 01
32. Optical connector sample display (5 types) : 01
 (Display should be enclosed in a enclosure with details of the connector/cable printed on the side. Acrylic sheet on the top for protection.)

---

8 | **Handheld Optical Power Meter** | **2**

The general purpose optical power meter will be applied for all power and attenuation measurements during installation and maintenance of all kind of fiber optic networks.
The fiber optic networks are based on fibers 9/125 µm...100/140 µm.
It has to cover all optical windows (850, 1300, 1550 nm).
The power meter shall be an easy operatable, lightweight, rugged and water resistant handheld instrument withstanding all practical environmental conditions like temperature, shock, bumps etc. For the optical ports a robust protection cap against dust and shock is included.

The instruments shall use standard batteries –dry cells or re-chargeables as preferred by the user- and it is easy to replace the batteries in the field.

Instrument specification

Parameters	Photodiode		Ge
	Wavelength range	780 ... 1600 nm	
	Switchable standard wavelengths	820, 850, 1300, 1550 nm	
	Display range	-60...+5 dBm	
	Max. power level	+ 10 dBm	
	Intrinsic error	± 0.20 dB	

Operating Mode	Display units	dB, dBm

Function	Dark current compensation		ZERO
	Reference setting	ABS--> REF and **free settable**	
	Special features	**TWINtest =** automatic	
		dual λ testing	
		with	

		appropriate source		
		Fiber identification (detection) by visual display of f_{mod}		
	Recalibration	Recalibration period		**3 years**
		Recalibration procedure	easy addressable user re-calibration	
	Display	Display resolution	LCD, 4-Digit, 0.01 dB	
		Modulation frequency (f_{mod})	270 Hz, 330 Hz, 1kHz, 2kHz	
		Operating status	PERM, LOW BAT-indication	
	Optical interface	**Universal Push Pull interface**	one adapter fitting all 2.5 mm connectors (e.g. ST-, SC-, DIN-, FC-, E2000)	
	Power supply	2-way powering	Dry cells, NiCd	
		Operating time (typ.)	**> 130 h** / > 42 h	
		Battery save function	Automatic shut off	
	Environmental cond.	Operating temperature	**-10...+55 C**	
		Storage temperature	-40...+70 C	
		Rel. humidity	up to 95 %	
	Electromagnetic Compatibility	CE-conformance acc. to EN 50081-1 / EN 50082-1		
9	**Handheld Optical Laser Source**			2

9 **Handheld Optical Laser Source**

The optical source will be applied for loss/ attenuation measurements during installation, operation and maintenance of TELECOM fiber optic networks. It will always be operating in conjunction with an appropriate power meter.
The source has to simulate the system parameters, so laser sources are preferred operating at 1310 and 1550 nm, coupling the output power into a **SM-fiber 9/125 μm**.

The instrument has to withstand all practical environmental conditions like temperature,

shock, bumps etc. For the optical ports a robust protection cap against dust and shock is included.

The instruments shall use standard batteries –dry cells or re-chargeables as preferred by the user- and it is easy to replace the batteries in the field.

Instrument specification

Parameter	Type		FP-laser
	Wavelength	Switchable, dual output port	
	Center wavelengt	1310 ± 20 nm and	
		1550 ± 20 nm	
	FWHM spectral width	< 5 nm	
	Laser classification	laser class 1 according	
		to IEC 825	

Operating Mode	**CW**	**calibrated output level: - 7 dBm**	
	AC: 270 Hz, 1 kHz, 2 kHz (Laser ON/OFF Dutycycle:50%)	calibrated output level: -10 dBm (for line identification)	
	Wavelength identifier	**AUTO-λ =** automatic λ setting with appropriate power meter	

Stability	Short term,15 min,T= const.		<= 0,02 dB
	Long term, 8 h, Λt= ± 3 C		<= 0,1 dB
	Overall uncertainty (-10..+50 C,incl. connectors)		<= 1 dB

Optical interface	most common connector		FC/PC

Power supply	Dry batteries	Operating time (typ.) > **45 h**	

			Battery save function	Automatic shut off	
		Environmental cond.	Operating temperature	-10...+55 C	
			Storage temperature	-40...+70 C	
			Rel. humidity	up to 90 %	
		Electromagnetic Compatibility	CE-conformance according to EN 50081-1 / EN 50082-1		

10	**OTDR (Optical Time Domain Reflectometer)**			1	
	S. No.	**Feature**	**Description**		
	1	Test Applications:	The Test Equipment shall allow to measure and characterize multimode and/or single mode fiber optic systems. Test modules shall allow to measure splice loss, fiber attenuation, reflectance, distance, fiber total loss, optical return loss etc. The product shall be field upgradeable to DWDM, CD, PMD testing in future. The modules shall be field interchangeable		
	3	Display	The size of the display shall be 8 inches minimum, and SVGA 800x600 type for best resolution.		
	4	Power Supply	The Test Equipment must be battery operated with inbuilt battery charger. The battery operating time shall be minimum 11 hours.		
		Meas. Capability			
	5	Meas. Wavelength	1310nm &1550 nm ± 20nm		
	6	CW Light Source	OTDR should have CW Light Source at OTDR Port.		
	7	Maximum distance range	260 km		

		8	RMS Dynamic Range	32dB / 30dB OTDR Module		
		9	Pulse Width	10ns to 10 µs		
		10(a)	Event Dead Zone	2.5m		
		10(b)	Attenuation Dead Zone	8 m		
		11	Distance Units	km, kft and miles		
		12	Group Index Range	1.30000 to 1.70000 in step of 0.00001		
		13	No. of Data Points	Up to 128 000 data points with 0.1s real time sweep		
		14	Distance Measurement	Automatic or dual cursor		
		15	Display Span	From 2.6 m up to maximum range		
		16	Display Resolution	1 cm		
		17	Cursor Resolution	From 1 cm		
		18	Sampling Resolution	From 4 cm		
		19	Accuracy	+/- 1m +/- sampling resolution +/- 1.10E-5xDistance((excluding group index uncertainties)		
		20	Attenuation Measurement	Automatic, manual, 2-point, 5-point and LSA		
		21	Display	From 1.25 dB to 55 dB		

		Span			
	22	Display Resolution	0.001 dB		
	23	Cursor Resolution	From 0.001 dB		
	24	Sampling Resolution	+/- 0.05 dB +/- 0.05 dB/ dB		
	25	Accuracy	0.01 to 5.99 dB in 0.01 dB step		
	26	Reflectance / ORL Measurements	Automatic or Manual		
	27	Bidirectional Analysis	Automatic Bidirectional OTDR Analysis capability		
	28	Display resolution	0.01 dB		
	29	Threshold	-11 to -99dB in 1 dB step		
	34	Interfaces/ Data transfer and Remote Control	The Test Equipment shall include the following interfaces for external devices 2xUSB host, ,RJ45 Ethernet		
	(a)	Test Files and data storage	The internal storage capacity shall be at least 8Mb.		
			Should have USB Pen Drive		
	36	OTDR Measurement Capabilities			
	37	Fiber Type	The Test Equipment shall be able to accurately measure G652, G653, G655 and any special fibers.		

		(a)	Test Functions and Features	The OTDR must have a one button operation mode.		
		(b)		The OTDR must give an indication of the quality of the front connection		
		(c)		The OTDR shall display:		
		(d)		☐ The type of event		
		(e)		☐ Distance of each event		
		(f)		☐ The Loss of each event		
		(g)		☐ The Reflectance of each event		
		(h)		☐ The Slope of the fiber		
		38		☐ The fiber total Loss		
		39	Industry standard and compliance	EMI/ESD: CE compliant, FCC part 15 subpart B Class 1		
		40	Physical and Environmental Specifications	Temperature range: Operating on mains:-20°C to +50°C Operating, all options: 0°C to +40°C Storage: - 20°C to +60°C Humidity: 95% without condensing		
11		**89C51Microcontroller development board with programmer** Atmel 89C51/52 MCU clocked at 11.0592MHz Expansion connectors for plug in modules and prototyping area On board programmer for AT89C51/ 52 and 55 devices USB interface to PC for programming Every pin is marked in order to make work easier Master Reset/Restart Key for hardware reset Input/Output & test points provided on board On board breadboard Self contained trainer with On board DC and AC power supply CD with sample project code, Programmer software & useful documents Exhaustive course & reference material **Technical Specifications** Serial communication : USB/RS 232 Port Baud rate : 9600 bps MCU : AT89C51/52 Crystal frequency : 11.0592 MHz Size of Breadboard : 175 67 8 mm			2	

	Tie points : 1685 Test points : 40 DC power supply : +12 V, -12 V, +5 V & -5 V Programmer unit : Ready to run programmer will program AT 89C51/52 & 55 Devices Interconnection for modules : 2 mm patch cords and FRC cables Power supply : 230 V 10 %, 50 Hz Accessories : USB cable cable ,Mains cord ,Operating and Experimental Manual , 2 mm Patch cords , Four 20 pin FRC cable ,One 10 pin FRC cable, software CD. **There should be no components on the top of the board.** **The trainer should encased in a molded box .**	
12	**PIC Microcontroller development board with programmer** PIC16F877A MCU clocked at 4 MHz Expansion connectors for plug in modules and prototyping area On board programmer RS232 interface to PC for programming Every pin is marked in order to make work easier Master Reset/Restart Key for hardware reset Input/Output & test points provided on board On board breadboard for connecting external components Self contained trainer with On board DC power supply CD with sample project code, Programmer software & useful documents Exhaustive course & reference material **Technical Specifications** Technical Specifications Serial communication : RS232/USB Port MCU : PIC16F877A Crystal frequency : 4 MHz Size of Breadboard : 175 X 67 X 8 mm Tie points : 1685 On board DC supply : ± 12V and ± 5 V Test points :30 Nos. Interconnections : 2 mm patch cords and FRC cables Programmer unit : Ready to run programmer will program PIC Devices Power supply : 230V ±10%, 50 Hz Fuse : 1A **Included Accessories** **:** RS232/USB cable ,Mains Cord ,Software CD 20 Pin FRC Cable ,10 Pin FRC Cable , 4 wire twisted FRC cable 20 pin ,Dust Cover 2 mm Patch cords ,Operating Manual **There should be no components on the top of the board.** **The trainer should encased in a molded box .**	2
13	Interface Modules with Micro controller Trainer (A) **Input Interface Module** **Keyboard** : ASCII Keyboard **LED'S** : Eight No's	3

Switches : Four No's
Keypad : 4 × 4 Matrix Keypad
Power supply : From Micro controller development
board with programmer trainer
Interface : 20 pin FRC cable
Test points : 2
Accessories include
20 pin FRC cable
ASCII keyboard
Operating E manual

(B) ADC/DAC Interface Module

ADC : ADC 0808
DAC : DAC 0808
ADC Input : 0 - 5 V DC (Variable)
& Reference
voltage range
Power supply : From Micro controller development board with
programmer trainer
Interface : 20 pin FRC cable
Test points : 36
Accessories include
20 pin FRC cable
Set of patch cords
Operating E manual

(C)   Computer Interface Module

Serial communication : RS 232 Port
Parallel Communication : 25 pin LPT port
Baud rate : 9600 bps
Power supply : From Microcontroller development
board with programmer trainer
Interface : 20 pin FRC cable
Test points : 2
Accessories include
20 pin FRC cable
RS-232 Serial cable
Printer cable
Operating E manual

(D)   Display Module

Display : 16 × 2Characters LCD
Contrast control : 0 - 5 V (Variable)
Backlight control : 0 - 5 V (Variable)
7 segment display : Four
Led bar graph : One
Power supply : From Microcontroller development
board with programmer trainer

	3
	3
	3

Interface : 20 pin FRC cable **Test points** : 32 **Accessories include :** 20 pin FRC cable Operating E manual **(E) Motor Drive Module** **Stepper motor** : +12 V **DC Motor** : +12 V **Servo motor** : +5 V **Power supply** : From Microcontroller development board with programmer trainer **Interface** : 20 pin FRC cable **Test points** : 13 **Accessories include :** 20 pin FRC cable Operating E manual **(F) Elevator control Module** **LED'S** : 6 Nos. **Switches** : 9 Nos. **Power supply** : From Development board with Programmer trainers **Interface** : 20 pin FRC cable **Output pin voltage** : 5V DC when particular O/P is activated **Accessories include :** 20 pin FRC cable Operating E manual **(G) TTL I/O Interface Module** Input pin voltage : 5V DC when particular I/P is activated Output pin voltage : 5V DC when particular O/P is activated LED'S : 12 Nos. Switches : 12 Nos. Power supply : From Development board with Programmer trainers Interface : 20 pin FRC cable **Accessories include :** 20 pin FRC cable ,Operating E manual	3 3 3