Equipment list of Electronics and telecommunication Engineering Department		
Sl. No.	**Description of items**	**Rate**
1.	**Satellite communication receiver trainer(Analog)** **Uplink Transmitter :** •Transmit three signals simultaneously at each up-linking frequency •2450-2468MHz up-linking frequencies selectable by Frequency selection switch and LED indication. •4 MHz clock frequency. •Wide band RF amplifier. No manual matching required. •PIC16F84 - 8 Bit RISC processor based PLL. •16 MHz Bandwidth •Frequency UP- Down switch and LED indication. •FM Modulation of Audio and Video. •5/5.5 MHz Audio and 8MHzVideo Modulation. •Detachable Dish Antenna. •Radiated Power output 25mW (approx.) with power control. •Transmit Audio, Video, Digital/Analog data, PC data, Tone, Voice, function generator waveforms etc. •Separate terminals provided for different inputs. •Power Supply - 220 Volts, ±10% , 50Hz. **Satellite Link :** •Transponder with selectable frequency conversion. •Choice of 2 downlink frequencies 2414-2432 MHz. •Rotary Switch and Tuner for selecting Uplink frequency. •Link Fail operation. •Detachable Dish Antennas. •Radiated power 25mW (approx.) with Variable gain control. •Power Supply 220 Volts, ±10%, 50 Hz. **Downlink Receiver :** •Receives and demodulate three signals simultaneously. •Based on Eurostar Tuner. •Intermediate Frequency 479.6 MHz (approx). •2414-2432MHz fix frequency tuning. •-60 dBm sensitivity at tuner input •Built in speaker for audio and video output. •Detachable Dish Antenna.	
2.	**Analog communication**	

	• **ASK, FSK, PSK modulation demodulation kit** The development boards must be designed around a FPGA with associated circuitry, for the realization of advance digital communications. The system must have facility for digital data inputs and outputs, along with switches and indicators. Facility for various test points must be provided. Facility for on boards USB programming of FPGA thru USB 16x2 LCD Display Hardware reset switch to refresh process Clock Generation of 10KHz output Data Clock and serial data test point. Test points to measure and test signals On board programming facility for development Switches 13nos with logic Led indicators Selectable data generator 8-bit data Generator DIP switches On board 3.3v and 5v power supply provision with test points Clock Generation of 10KHz output Data Clock and serial data test point. Facility for FSK –modulator /Demodulation circuit using programmable FPGA Facility for ASK –modulator /Demodulation circuit using programmable FPGA Facility for PSK –modulator /Demodulation circuit using programmable FPGA • **AM and FM modulation demodulation kit** • **PCM modulation demodulation kit** Audio codec: Stereo inputs: single ended number of bits per channel : 16 bits (left and right) sampling rate: 48,24,12 and 6KHz system Clock :256x (Sampling Clock) clock source on-board, analog signal sinusoidal with Frequency upto 3.3 KHz and amplitude	

	0-5 Vpp • **CDMA DSSS modulation kit** On board PN Sequence Generator 5,95 k Bits / sec On board switch selection for DSSS and FHSS On board carrier freq gen 23.8khz On board BPSK mod / demodulator Additional Information about this trainer Kit On board comparatot and data recovery block Facility for on boards USB programming of FPGA thru USB 16x2 LCD Display Hardware reset switch to refresh process Clock Generation of 10KHz output Data Clock and serial data test point. Test points to measure and test signals On board programming facility for development Switches 13nos with logic Led indicators Selectable data generator 8-bit data Generator DIP switches On board 3.3v and 5v power supply provision with test points Clock Generation of 10KHz output Data Clock and serial data test point. • **Delta modulation and demodulation** Schemes: Delta Modulation, Adaptive Delta Modulation, Sigma Delta Modulation 1st order. Xylinx nFPGA based Trainer. Crystal Frequency 25MHz Slide switches for scheme selection 8 bit DAC and ADC Sampling frequency 8, 16, 32, 64 kHz through selection switches Sin, Triangle, Variable DC Signal through Potentiometer Individual frequency Selection for signals 500 Hz, 1 KHz 2 KHz 3KHz using switches. Testpoint for sample and hold outputs and the	

	final modulated output, demodulated output . 4th order low pass butter worth filter frequency 3 KHz • **TDM PCM kit** Xylinx nFPGA based Trainer. Crystal Frequency 25MHz No. of Channels 4. Two analog, two digital 8 bit DAC and ADC Sampling frequency 8, 16 32 64 kHz through selection switches SINE triangle square random binary sequence Individual frequency Selection for signals 500 Hz, 1 KHz 2 KHz 3KHz using switches.	
3.	**Stair lighting system** **Advance PLC Training System** • **Allen Bradley/Wago PLC with HMI Screen & SD card storage** • Configurable to both 24v dc & 230vac, Built in 24 V DC power supply, • Digital/Analog inputs & outputs, , • I/O LED indication on front line panel, 64 Kbytes memory, • I/O simulating devices (Toggle switch ,push to ON switch), • Separate module for proximity sensor interface with PLC • On Board Potentiometer control analog input. • Provision to interface PLC module with • Customized system and for student project interface. • Relays protected output. • Mains socket with self illuminated switch and dual fuse protection. • All major components are covered with acrylic or transparent sheet. • USB based programming. • PLC should be supply with simulation of all	

	given below module on PC interface with graphical view. • Data o/p of PLC should be interface with PC using DSC module using labview software • It must be supplied in Aluminum Rack with change option of application Module. • On processor module Buzzer for alarm condition , • Sequential motor Starter interface • Star /delta starter interface • DOL Starter • Water level controller • Reaction vessel interface • Resistance welding interface • Traffic Light • Car parking interface • Piston cylinder interface Strair case application	
4.	**VLSI Trainer** **Xilink software, FPGA/CPLD kit**	
5.	**Radar trainer(Operational & Application)** Transmitting frequency :10 GHz o/p power 10-15 mW Operating voltage: 8.6 V, Antenna : Horn IF Output : Audio range Alarm detected signal indication Seven segment Display for object counting Audio cable for PC input, Din connector cable Tripot stand ,Fan, Sliding platform, Different objects Horn Antenna-trans-receiver unit, pendulum Stand for moving the pendulum, Tuning forks	
6.	**Fiber optics trainer** ▪ The fiber board has facility of 2 transmitters with 660 and 850 nm LEDs ▪ On board 2 Receiver with photo detector ▪ Receiver 01 - Photo transistor with responsivity of 80µÁ / µ ▪ Receiver 02 - Photo detector with TTL logic output ▪ Facility for Manchester coding /decoding	

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<td>technique.
▪ Digital noise generator source output.
▪ 16 bit switch selectable PRBS generator
▪ On board Clock generator - 32 KHz, 64 KHz, 128 KHz
▪ Bit error rate measurement using 10-bit counter with LED indication up to 255 count
▪ Facility for 8 channels Time division multiplexing, (64 Kbits/Sec)
▪ One 8-bit user selectable markers in alternate frames for Frame marker
▪ The trainer has PC to PC communication data
▪ Baud rate – Maximum 115.2Kbps Baud
▪ Standard Fiber optic cable – 1.8 mm plastic optical cable
▪ Test Points to observe signals
▪ Interconnections - 2mm banana sockets
▪ On board power supply.
▪ The complete system will supplied with connecting leads, power chord,
▪ study and experimental user manual.

Wavelength Range (nm) :- 850 ~ 1550
Standard wavelength (nm) 850/ 980/ 1310/ 1490 / 1550
Display LCD</td>
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<td>ISDN-Integrated service Dial network trainer kit</td>
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<td>8.</td>
<td>Antenna trainer kit 700MHz
<table>
<tr><td>Generator</td><td>750 MHz approx. (Output adjustable)</td></tr>
<tr><td>Tone Generator</td><td>1 KHz approx (output adjustable)</td></tr>
<tr><td>Directionable Couple</td><td>Forward & Reverse (selectable)</td></tr>
<tr><td>Matching Stub</td><td>Slider Type</td></tr>
<tr><td>Antenna Rotation</td><td>0-360 deg. Resolution 1 deg.</td></tr>
<tr><td>Receiving Antenna</td><td>Folded dipole with reflector.</td></tr>
<tr><td>Detector Display</td><td>Level adjustable meter.</td></tr>
<tr><td>Power supply</td><td>220V± 10% 50Hz, 3VA (approx.)</td></tr>
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		<table><tr><td>Interconnections</td><td>4mm Banana sockets</td></tr><tr><td>Dimensions (Main unit)</td><td>W520 x D300 x H120 mm</td></tr><tr><td>Weight (main unit)</td><td>2.8 kg. approx.</td></tr></table> • Dipole ½ Folded Dipole ½ • Dipole ¼ Yagi UDA Folded Dipole (3E) • Yagi UDA Folded Dipole (5 E) • Yagi UDA Dipole (7E) • Yagi UDA Dipole (5E) • Horizontal End Fed Hertz Antenna • Horizontal End Fed Zeppelin Antenna • Ground Plane Antenna • Ground Plane Antenna • Ground Plane Antenna • Ground Plane with Reflector & Director • Slot Antenna ½ • Loop Antenna H elix Antenna • ½ Phase Array ¼ Phase Array • Combined Collinear Array • Log Periodic Antenna Rhombus antenna • Cut Paraboloid Reflector antenna 3 ½ Dipole Antenna • Broadside Array 2. Current Probe 3. Mounting stands 4. BNC-Tee 5. BNC-BNC adapter M 6. BNC-BNC adapter F 7. BNC-BNC cable 8. Screwdriver 9. Operating manual 10. Student workbook 11. Radiation Pattern Plotting software 12. Polar graph 13. Antenna fabrication kit 14. Power cord 15. Accessories case	
9.	**Computer Interface Electronics trainer**		

	1• Concept circuits diagrams are printed on board. • Transducers load cell, temperature sensor and pressure sensor. • Inbuilt power supply, digital voltmeter, Arduino microcontroller. • Low pressure sensor with 0 to 5 psi range,compressive type load cell. • Resistance temperature detector sensor –PT100. • Real time Data output can observe on labview based GUI software. • Output is available in form of graph & voltage. • Test points facility to measure & observe output signals. • Readings storing and import facility in excel format. • The complete system available with Graphical user interface software ,user's manual & accessories. • 2. On board: -LVDT , Microphone, Hall Sensor, Strain Gauge, Ultrasonic Trans receiver, Temp Sensor(Lm35, NTC, Thermocouple), Humidity sensor ,Buzzer, Voltmeter (0-20v) Generate square wave of 5v with 555 timer. Light Sensor :- Photo Diode, Photo Transistor., Photo Voltaic Cell, LDR . • Signal conditioning :- Instrumentation Amplifier, Class Amplifier, Differential Amplifier. • Variable Resistor :- Servo Potentiometer, Slide Resister, Rotary Resister, Wire Wound Resister, Carbon Track Resister • Bridge rectifier , filter ,variable capacitor • *accelerometer sensor • *USB PC interfacing software VI. • *Alluminium frame packing. ○ 4*4 seven Segment Display	
10.	**Telephone link using fiber optic cable trainer**	
11.	**Micro controller 8051 trainer kit & interfacing**	

	The system must be support various processors like 8051, PIC, AVR, Arduino, Arm processors, MSP 430. The system must have facility for all these processors on a combination of mother board and daughter board combination. All daughter board must be able to operate with power adaptor facility so they can be used separately On Board RegulatedPower Supply Board includes a 12-bit Analog-to-Digital Converter (On board 2401 Serial EEPROM. Special voltage regulator for A/D conversion modules. On board Piezo buzzer On board 72 push buttons & 72 SMD LED On Board MMC/SD Card slot using fast SPI communication. Board supports Dallas DS18S20 One-Wire temperature sensor. On board Dual LCD GLCD 128x64 &LCD 2x16 display interface connector. 8051 Daughter Board with USB Interface Philips 89V51RD2BN controllers Four 10 pin Box header for 4 ports with VCC and GND on each connector 11.0592 MHz crystal One 10 pin box header for programming purpose. **Bidder has to provide 2 days' workshop on this products at our premises** **INTERFACING** **A. Accelerometer Sensor Interface** On board accelerometer sensor with ±1.5g, ±6g Three axis Accelerometer Module, Board has all the necessary components required for the accelerometer. Board comes with onboard 3.3V Low Drop voltage regulator. Accelerometer module can be powered from 2.2V to 6V. Accelerometer has self test, 0g-Detect which detects linear freefall, user selectable g range of 1.5g and 6g and sleep mode to reduce power	

	consumption. **B. Humidity Sensor Interface** On board humidity sensor module with facility of conversion from relative humidity to voltage with range of operating humidity from 10 -90%rh with accuracy of +-5% operated voltage 5v test points to measure relative output voltage and power supply **C. RF Experimental Interface** 433 MHZ RF anteenas with range upto 10 meter 4 led indicators to check data status Data Encode decode chip **D. LM35 Temperature Sensor Interface** LM 35 temperature sensor with on board power Temperature output test points to measure voltage. 10 pin I/O interface header **E. Traffic Light Study Card** This interface simulates the control of Traffic Lights at a traffic island. In each of four directions (East, West, North, South). 5mm LED indicators Amber Red, yellow, green led are provided. 16 LED's are controlled through not gate **F. DC Motor Interface** On board dc motor with input power requirement PWM based speed control Isolated circuit facility from back EMF. Facility to observe pulses on CRO **G. Relay Buzzer Interface** Easy to interface with microcontroller/Microprocessor 2 no of 12V or 5V relays as switch & buzzer as indicator Isolated circuit to protection microcontroller from back EMF. **H. Stepper motor interface**	
12.	**Embedded kit (ARM processor and its operating system)** The system must be supplied with various	

	processors like 8051, PIC, AVR, Arduino, Arm processors, The system must have facility for all these processors on a combination of mother board and daughter board combination. All daughter board must be able to operate with power adaptor facility so they can be used separately On Board RegulatedPower Supply Board includes a 12-bit Analog-to-Digital Converter (On board 2401 Serial EEPROM. Special voltage regulator for A/D conversion modules. On board Piezo buzzer On board 72 push buttons & 72 SMD LED On Board MMC/SD Card slot using fast SPI communication. Board supports Dallas DS18S20 One-Wire temperature sensor. On board Dual LCD GLCD 128x64 &LCD 2x16 display interface connector. **ARM LPC 1768 Daughter boards** Five10 pin Box header for 4 ports VCC and GND on each connector and with power jack connectors One 10 pin box header for programming purpose	
13.	**Electronics work bench** • **Function generator** • **DSO** • **DC dual power supply 0-30v 2 Amp** • **Soldering and desoldering station** • **Tool kit**	