

**BHAGALPUR COLLEGE OF ENGINEERING, NH -80,
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(Department of science & Technology, Government of Bihar)



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Ref *TEQIP/cell/0014*

Dated: 20 July 2018

Letter for Expression of Interest.

Bhagalpur College of Engineering intends to procure equipment for **Electronics and Communication Department-Communication Lab**. List of equipment is in Annexure-1. Interested manufacturers/Suppliers are requested to submit following details through mail within 1 (one) week of publishing of this notice at tpobcebgs8@gmail.com.

Information Required.

- (1) Name of the firm:
- (2) Complete address with pin
- (3) Name of contact person
- (4) Email id of the contact person
- (5) Mobile no of the contact person

Anshul
20/7/18
(Prof. Anshul Shekhar)
TEQIP-III Procurement Coordinator
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Annexure-1
COMMUNICATION LAB

SN	Items name	Specification
1.	Sampling & Reconstruction (standard comp.) Trainer:	<ul style="list-style-type: none"> • Onboard synchronized 1 KHz Sine-wave generator. • Sampling frequency 2,4,8,16,32 KHz • On-board separate Sample and Sample & Hold circuit / output. • Sampling Duty cycle of 0-90% in steps • On-board 2nd & 4th order Low pass filter with cut off frequency of 3.4kHz • In-Built Power Supply
2.	TDM Pulse Amplitude Modulation/ Demodulation Trainer:	<ul style="list-style-type: none"> • Input channels: 4 numbers • Switching: Time Division Multiplexing • Modulation: Pulse Amplitude Modulation • Sampling rate: 16 KHz • Maximum signal BW: 2 KHz • Onboard sine waves: 2KHz, 1KHz, 500Hz, 250Hz, 0-5V variable amplitude • Synchronization pulse generation: Using variable DC level • Phase lock loop: Generates receiver clock and channel information • Low pass filter type: 4th order Butterworth filter • Interconnection: 2 mm banana socket • Power Supply: +5V, +/-12V
3.	TDM Pulse code modulation Transmitter Trainer :-	<p>Crystal Frequency : 16 MHz, On Board Analog Signal : 2 KHz, 4 KHz (Sine wave synchronized to sampling pulse Adjustable amplitude and separate variable DC level)</p> <p>Input Channels : 2 nos.,</p>
4.	TDM Pulse code modulation Receiver Trainer:-	<p>Input Channel : Time Division Multiplexed Serial Input with in-built Power Supply : 220 V \pm10%, 50Hz</p>
5.	Adaptive Delta And Delta Sigma modulation & demodulation trainer kit:	<ul style="list-style-type: none"> • Crystal Frequency : 4.096 MHz • Sampling Frequencies : 32 KHz, 64KHz, 128KHz, 256KHz, (switch selectable) • On - Board Generator :

		<p>Synchronized & Adjustable Amplitude Sine wave Generator at 250Hz, 500 Hz, 1KHz, 2KHz, Separate variable D.C. Level</p> <ul style="list-style-type: none"> • Integrator : 4 Integrator gain setting norm, X 2 X 4 X 8 • LP Filters : 4th order Butterworth (3.4 KHz cut off frequency) • Test Points : More than 55 • Interconnections : 2/4 mm socket • Cabinet : Enclosed in ABS plastic cabinet with detachable cover • Power : 220V AC $\pm 10\%$, 50/60Hz mains operated
6.	Data Formatting And carrier modulation/Transmitter trainer:	<ul style="list-style-type: none"> • Input : 2 Channel Time Division Multiplexed Data • Data Formatting : NRZ (L), NRZ (M), AMI, RB, Biphas (Manchester), Bi phase (Mark), differentially encoded dibit pair • Carrier Modulation : ASK, FSK, PSK, DPSK, & QPSK • On - Board Carrier : Sine wave Synchronized to transmit data at 1.44MHz, 960 KHz, (0 deg. phase) 960 KHz (90 deg phase) • Test Points : More than 38 • Interconnections : 2/4 mm socket • Cabinet : Enclosed in ABS plastic cabinet with detachable cover • Power : 220V AC $\pm 10\%$, 50/60Hz mains operated
7.	Data Reformatting And carrier Demodulation Receiver Trainer:	<ul style="list-style-type: none"> • Input : From Transmitter Kit. • Output : 2 Channel TDM Multiplexed Data Stream. • De conditioning Options : NRZ (M), RZ, AMI, RB Bi phase (Manchester), Bi phase (Mark), differentially encoded dibit pair to NRZ (L). • Carrier Demodulation : <ul style="list-style-type: none"> ○ - ASK Rectifier Diode ○ - FSK PLL Detector ○ - PSK & DPSK Square Loop Detector ○ - QPSK Fourth Power Loop

		<p>Detector</p> <ul style="list-style-type: none"> • Bi phase clock recovery : by PLL. • Test Points : More than 50. • Interconnections : 2/4 mm socket. • Cabinet : Enclosed in ABS plastic cabinet with detachable cover. • Power : 220V AC $\pm 10\%$, 50/60Hz mains operated.
8.	DSB/SSB Suppressed carrier AM Transmitter Trainer	<p>Balanced Modulator with Band, Carrier Frequency -Crystal controlled, Transmitter Amplifier Output(Gain adjustable) DSB (1 MHz), SSB (1.445 MHz) connected to Antenna/cable</p>
9.	DSB/SSB AM Receiver Trainer	<p>with in-built Power Supply : 220 V $\pm 10\%$, 50Hz Frequency Range : 455 KHz to 1800 KHz Intermediate Frequency : 455 KHz</p> <ul style="list-style-type: none"> • Input Circuits : RF Amplifier, Mixer, Local Oscillator, Beat Frequency Oscillator, IF Amplifier-1, IF Amplifier-2 • Tuning : With variable capacitor Dial marking on board • Receiving media : Telescopic antenna / Cable • Detectors: Diode detector for DSB, Product detector for SSB • Audio Output : Amplifier with speaker • Gain Control : Potentiometer Control Amplitude • Interconnections : 2 mm Banana sockets • Test points : 12nos. • Power Supply : 230V AC $\pm 10\%$, 50/60Hz
10.	Amplitude Modulation And Demodulation trainer Kit with in-built Power Supply : 220 V $\pm 10\%$, 50Hz	<ul style="list-style-type: none"> • Circuit diagram printed on pcb • On-board Carrier Generator • On-board Modulating Function (Signal) Generator with variable amplitude & frequency • On-board Amplitude Modulator • On-board Amplitude Demodulator • On-board potentiometer for varying depth/percent of modulation • Interconnection: 2/4mm banana sockets • DC Supply: Built-in IC regulated power supplies 220V $\pm 10\%$, 50Hz mains

		<ul style="list-style-type: none"> operated Enclosed in an attractive ABS plastic cabinet with cover
11.	FDM Trainer: frequency division multiplexing & Demultiplexing with sinusoidal & Audio Input	<ul style="list-style-type: none"> Linear mixer (Summing amplifier). Amplitude modulator. Transistor demodulator. Band pass filters. Carrier generator generates minimum 20KHz to maximum 200KHz frequency and the amplitude to be 12V(P-P). Signal source with four different frequency vin1 (500Hz), vin2 (2.5KHz), vin3 (5KHz), vin4 (10KHz) (approx.) Built it regulated power supply: DC +/- 12V/300 mA Power Supply: Voltage range : AC 100V - 230V , Frequency Range : 50-60Hz
12.	FM Transmitter & Receiver kit	<ul style="list-style-type: none"> Carrier signal Generator Modulating - Externally Input provision Wood Box (Closed Type) Input : 230V, AC
13.	QPSK Trainer Kit	<ul style="list-style-type: none"> Word Length : 8 Bits Word Clock Frequency : 8 KHz to 12 KHz Data Format : NRZ & Bipolar NRZ, Modulator Type : Balanced Modulator as Phase Modulator Demodulator Type : Balanced Modulator as Phase detector. Bit clock recovery section
14.	FSK Trainer Kit:	<ul style="list-style-type: none"> Message Signal 1 : 8 Bit variable Data Amplitude 5V Message Signal 2 : Debounce Data Amplitude Low (0) & High (5V) Message Signal 3 : Fixed Data 1K, 2K, 4K Amplitude 5V Carrier Signal : Sine wave Mark 70 KHz / Space 30 KHz Amplitude 5V Modulator Type : XR 2006 Based Demodulator : PLL Detector &

		<p>LPF</p> <ul style="list-style-type: none"> • Comparator : LM 311 Based • Supply Voltage (Board) : +12V, +5V / DC • Supply current : 100 mA (Minimum) • Input Voltage : 230 V/ 50 Hz AC • Interface connectors : 2mm socket
15.	BPSK Trainer Kit -	<ul style="list-style-type: none"> • On Board Modulating Digital Data signal generator to generate any binary input word with Bit clock & Word clock, • Word Length : 8 Bits, Word Clock Frequency : 8 KHz to 12 KHz, • Data Format : NRZ & Bipolar NRZ, • Modulator Type : Balanced Modulator as Phase modulator, • Demodulator Type : Balanced Modulator as Phase detector.
16.	PAM/PWM/PPM modulation & Demodulation Trainer kit:	<p>On-board Sampling : 2 KHz to 64 KHz</p> <ul style="list-style-type: none"> • Variable duty Cycle : 0 to 90% Variable • On-board Generator Sine wave : 1 KHz to 4 KHz, Amplitude: 0 to 5vpp • Low Pass Filter : 2nd order BW filter • Voice communication : Voice link using dynamic MIC & speaker • AC Amplifier : With adjustable Gain Control • Interconnections : 2mm banana sockets • Test Points : More than 10 nos. • Power Supply : 230 V, \pm 10%, 50 / 60 Hz
17.	Super Hetrodyne Receiver:	<ul style="list-style-type: none"> • Tuning Range : 520 KHz - 1620 KHz • IF Frequency : 455 KHz • Tracking : - 3 db from 700 KHz to 1400 KHz • 10 db Signal to Noise at 200 microvolt typical
18.	PCM Trainer kit:	<p>Message Signal 1 : Frequency 500 Hz Amplitude 0 to 2.5V</p>