DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE
At. Po. Lonere, Tal. Mangaon, Dist. Raigad 402 103 MS (www.dbatu.ac.in)

INVITATION FOR QUOTATION

Our Ref No. : DBATU/Store/EXTC /Trainer Kit for AC Lab/2024/ 218   Date: 17 /01 /2025   **2 0 JAN 2025**

Quotation For: **Trainer Kit for Analog Communication Lab**   Due On: 03 /02/2025

Date of Opening: 04 /02 /2025   Time: 11.30 am

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Sub: QUOTATION FOR THE SUPPLY OF STORE

Dear Sir,

Your quotation for the items listed overleaf, may please be submitted to the under signed, so as to reach this Office not later than 03 /02/2025

While submitting your quotation, the following procedure may please be observed and other points borne in mind.

1. The maker's name must be specified.
2. The "Terms and Conditions" for supply and delivery of stores, should be clearly indicated in the quotation, stating whether rates are, inclusive of all taxes, Packing and forwarding charge,s Freight charges, etc. or not, however rates offered as including all taxes will be more welcome.
3. If packing and forwarding charges are to be charged separately, it should be so clearly stated in your quotation.
4. Please mention clearly whether consignment would be Ex-Godown, Ex-Shop, of F.O.R. dispatching stations. Preferably terms offered as "Delivery of consignment of stores, on F.O.R.
5. Envelope should be super-scribed "Quotation for reference No...... of dated....." It should also be superscripted as per the format given above.
6. The quotation would be opened as per date and timing given above, if desired by you, you may depute an authorized representative with a letter of authority to be present at the time of opening of the quotation at this Office on the aforesaid day, date & time.
7. Your quotation must be valid for a minimum 30 (Thirty) working days from the date of it's opening.
8. Quotation received after the date of opening may not be taken into consideration.
9. Items tendered should confirm to the specification shown in the attached list when and where, full or no specifications are indicated against items in the list. Kindly furnish your full specification in accordance with accepted standards against each item tendered. Where reference to catalogue is made, the relevant catalogues/ Pamphlets/ Literature should accompany the quotation.
10. Your quotation should be for all new items and not for second1 hand.
11. Please state whether items will be available Ex-Stock. If not the minimum period for delivery, or for supplying the items or stores.
12. It should be clearly stated whether **GST**, Insurance, Freight or packing and forwarding charges, or any other taxes and duties, etc. leviable.
13. It would be appreciated if illustrated catalogues/Literature etc is furnished with the quotation.

14. Expression to as "Complete with standard Equipment" complete with standard accessories "Equipment to" As good as should be avoided. If at all their use is unavoidable then it should be very specifically indicated as to what exactly they mean and what exactly would be supplied under them. Any ambiguity or vagueness should be avoided.

15. For convenience, kindly adopt while quoting the same serial Nos. as given in the list detailed below.

Thanking You.

Yours faithfully,

Registrar
Dr. Babasaheb Ambedkar Technological University, Lonere

List of Items

Sr. No	Description	Make	Approx. Qty Req.	Rate per / Each / Unit	Remarks
01	**Trainer Kit for Analog Communication Lab** (Details Specification are as per Annexure – I attached herewith)		09		

➢ Quantity may vary

Dr. Babasaheb Ambedkar Technological University, Lonere
Department of VLSI Design & Technology
Annexure-1

Sr. No.	Description	Qty	Estimated Cost (per Desk)	Total Estimaed Cost
1	**DSB/SSB AM Transmitter Kit** **SALIENT FEATURES :** On board variable frequency audio oscillator, carrier frequency generator. On board DSB and SSB modulator, Band pass filter, 455 KHz generator, audio & RF amplifiers. Transmitting antenna, Speaker & Headphones. **Technical Specifications:** Audio Oscillator : Sinewave with variable Frequency and Amplitude (300 Hz – 3.4 KHz). Audio Output : Amplifier with Speaker / head phone. Modulators : 1. Balanced Modulators with band pass Filters (1MHz) 02 Nos. 2. 01 Nos Balanced Modulator. (455 KHz) Band Pass Filter : Ceramic filter. Carrier Frequency : Crystal controlled 1 MHz generator. Modulator output : 1. DSB at 1MHz. 2. SSB at 1.455 MHz. Transmitter Output : through gain adjustable amplifier connected to antenna / cable. Switched faults : 8 nos. Test Points : 27. Interconnections : 4mm Banana sockets and patch cords. Power Requirement : 230V+10%, 50 Hz, 1? AC. Accessories : 1. Instruction Manual. 2. Set of Patch cords. EXPERIMENT : 1. Study of carrier frequency generation. 2. Study of DSB and SSB AM Generation & Transmission. 3. Study of Transmitter tuned circuits.	1		
2	**DSB/SSB AM Receiver Kit** **SALIENT FEATURES :** On board variable capacitor tuning. On board receiving antenna, LO, BFO, RF amplifier, Mixer, IF amplifier, Detectors, AGC, audio output, and speaker. **Technical Specifications:**	1		

	Receiver Principle : Super Hetrodyne. Frequency Range : 525 KHz to 1625 KHz. IF Frequency : 455 KHz. Receiver circuit : Consists of RF amplifier, Mixer, Local oscillator, BFO, IF amplifier 1, IF amplifier 2. Tuning : Variable ganged capacitor with on board dial marking Receiver input : Using receiving (telescopic) or by RF cable Tx output (Adtron Model 7506) Detector : 1. Diode detector for DSB. 2. Product detector for SSB. Audio output : Amplifier with speaker/headphone AGC control : Switchable. Test Points : 50. Interconnections : 4mm Banana sockets and patch cords. Power Requirement : 230V+10%, 50 Hz, 1? AC. Accessories : 1. Instruction Manual. 2. Set of Patch cords. EXPERIMENT : 1. Study of DSB and SSB AM Reception & detection by diode / product detectors. 2. Study of AGC. 3. Study of receiver tuned circuits.			
3	**FM Transmitter & Receiver Trainer Kit** Salient Features • On board variable frequency audio oscillator • On board FM modulator, detectors, amplitude limiter and filter • On board mixer amplifier & LPF amplifier Technical Specifications: • Audio Oscillator: Sinewave with variable Frequency and Amplitude (300Hz to 3.4 KHz) • FM Modulator (with Carrier freq. adj.): 1. Reactance Modulator 2. Varactor Modulator • Mixer/Amplifier (with gain adj.): Allows FM input to be amplitude modulated by noise prior to demodulation • Transmitter Frequency : 455	1		

	KHz • FM Demodulators (05 nos.): 1. Detuned Resonant detector. 2. Quadrature detector. 3. Fooster seeley detector. 4. Ratio detector 5. PLL detector • Low Pass Filter Amplifier: 3.4 KHz cut off frequency with adjustable gain • Switched faults: 8 nos • Test-points: 74 • Interconnections: 4mm Banana sockets and patch cords • Power Requirement: 230V+10%, 50Hz, 1+ AC • Accessories: 1. Detailed Instruction Manual 2. Set of patch cords Experiments: 1. Study of 2 types of FM modulators & 5 different types of demodulators 2. Effect of noise on FM transmission & study of tuned drcuits 3. Separate VCO circuits to demonstrate FM waveforms			

4	**PAM/PWM/PPM Mod/Demod Trainer Kit**
	Salient Features
	
	• Various types of Modulation / Demodulation techniques such as:
	    ▪ Pulse Amplitude Modulation (PAM)
	    ▪ Pulse Width Modulation (PWM)
	    ▪ Pulse Position Modulation (PPM)
	• Analog Sample, Sample & Hold and Flat top outputs
	• On-board selectable 4 different sampling pulso frequencies
	• On-board Filter and AC Amplifier
	• On-board Square & Sine wave generators
	• Voice communication Using dynamic & speaker
	Technical Specifications:
	• Modulation:
	1. Pulse Amplitude Modulation (PAM)
	2. Pulse Width Modulation (PWM)
	3. Pulse Position Modulation (PPM)
		1		

	- On-board Sampling Pulse Frequency: 8KHz, 16KHz, 32KHz, 64KHz - On-board Generators: a. Square Wave-1KHz & 2 KHz b. Sinewave-1KHz & 2 KHz with adjustable amplitude - Voice Communication: Voice link using Dynamic Mic & Speaker - Low Pass Filter: 4 order Butter worth Low Pass Filter - AC Amplifer: With adjustable gain control - DC Output: Variable (0 to 4V) - Switched Faults: 08 nos - Test Points: 29 nos - Interconnections: 4mm sockets - Power: 230V±10% 50Hz, 1+ AC - Accessories: a. Detailed Instruction Manual b. Set of patch cords Experiments: - Study of Pulse Amplitude Modulation (PAM) & demodulation using Natural Flat Top Sampling and Sample & Hold Sampling - Study of Pulse Width Modulation (PAM) & Demodulation using Different Sampling Frequency - Study of Pulse Position Modulation (PPM) & Demodulation using DC Input & AC (Sinewave) input - Study of voice Communication using PAM, PWM & PPM techniques				
5	**Pre-Emphasis Circuit Trainer** SALIENT FEATURES : ▶ Completely self contained stand - alone unit. ▶ Demonstrates the principle and working of a Pre - emphasis circuit. ▶ Supply required 230 V, 50 Hz AC. ▶ Built - in IC based power supply with short circuit protection and LED indication for supply "ON".	1			

	▶ Transistorised Circuit with Selectable L / R network to get different time constants. ▶ Plot the graph of input frequency v / s output voltage for different L / R time constants. ▶ Test points provided in the circuit at various stages to observe the waveforms and voltages. ▶ Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on the front panel. ▶ Strongly supported by a comprehensive instruction manual complete with theory and operation details.			
6	De-Emphasis Circuit Trainer SALIENT FEATURES : ▶ Completely self contained stand - alone unit. ▶ Demonstrates the principle and working of a De - Emphasis Circuit. ▶ Passive Circuit using RC. ▶ Bank of Resistor and Capacitor. ▶ Plot of input frequency v / s output voltage for different R - C time constant. ▶ Test points provided in the circuit at various stages to observe the waveforms and voltages. ▶ Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on the front panel. ▶ Strongly supported by a comprehensive instruction manual complete with theory and operation details	1		

	7	TDM Pulse Amplitude Mod/Demod or TDM Mux/Demux Trainer SALIENT FEATURES: Completely self – contained stand – alone unit. Demonstrates the principle and working of a Time Division Multiplexing and Demultiplexing circuit. Supply required 230V, 50Hz AC. Built – in IC based DC regulated power supply with short circuit protection and LED indication for supply "ON". Transmission of several separate information channels in the same communication circuit simultaneously and without interference. Study of 4 channel TDM generator using pulse duration modulation. Observation of the output in the CRO. Receiving or demultiplexing of several separate information channels in the same communication circuit simultaneously and without interference. Study of 4 channel time division demultiplexing. Analog / digital signals can be obtained at any of the 4 channels. Multi – coloured test points are provided at various stages in the circuit to observe the waveforms and voltages. Housed in an elegant cabinet with a well spread intelligently designed circuit layout on the front panel. Strongly supported by a comprehensive instruction manual complete with theory and operating details.	1		
8		Frequency Division Mux/Demux Trainer Kit Two channel FDM with one channel as audio Study & demonstrate the carrier generation, AM, DSBSC Modulation Study DSBSC demodulation. On board carrier generator and two variable frequency audio oscillator On board DSBSC modulator adder, DSBSC demodulator, low pass filter, output amplifier Microphone and headphones provided	1		

Detailed instruction manual
TECHNICAL SPECIFICATIONS
Channels : Two channel FDM
Carrier Generators : Two sine wave
generators a. 100 KHz & b. 200 KHz
Modulating Input Frequencies : Two
separate sine wave generators of 1 KHz –
10 KHz
(variable frequency and variable
amplitude)
Modulators : Two DSBSC (Double Side
Band Suppressed Carrier)
Demodulators : Two DSBSC (Double
Side Band Suppressed Carrier)
Low Pass Filters : Two separate fourth
order low pass butterworth filters
with a cut of frequency of 10 KHz
Output Amplifier : One output amplifier
with a gain of 20
Test Points : 46
Interconnection : 4 mm banana socket
Power Requirement : 230V + 10 %, 50
Hz AC
Accessories : 1. Detailed Instructions
Manual
2. Set of Twelve patch cords
3. One Microphone
4. One Headphone
EXPERIMENTS POSSIBLE :
Two channel FDM with one channel as
audio.
2. Study & demonstrate the carrier
generation, AM, DSBSC Modulation.
3. Study DSBSC demodulation.

#	Description	Qty		
9	**Super Hetrodyne Transistorised Receiver Trainer** SALIENT FEATURES : ▶ Completely self contained stand - alone unit. ▶ Demonstrates the principle and proper working of a super hetrodyne transistorised receiver. ▶ Supply required 230V, 50Hz AC. ▶ Built - in DC regulated power supply with short circuit protection and a LED indication for supply "ON". ▶ Single band MW (520 - 1620 KHz) dynamic demonstrator. ▶ Built - in faults introducing facility, through switches. ▶ Common faults given for actual hands on experience in fault diagnosis and maintenance. ▶ Volume control & tuning on board. ▶ Test points at various stages in the circuit to observe & record the wave -	1		

	forms and voltages. ▶ Housed in an elegant metal cabinet with a well spread intelligently designed circuit layout on the front panel. ▶ Strongly supported by a comprehensive instruction manual complete with theory and operation details.		