MINUTES OF PRE BID MEETING

Tender for Supply, Delivery, Installation & Commissioning of Laboratory Equipment for Department of Engineering Technology, Faculty of Technological Studies

Tender No : UWU/AHEAD/18/TS/ET/02
Date & Time : 08th August 2018 & 2.00 p.m.
Venue : Admin Board Room

The Following decisions were made at the Pre Bid Meeting.

At the Pre Bids Meeting following clarification were made against the bidders' questions.

a. Changes in specifications – Specifications of following item were changed at the Pre Bid Meeting (Refer annexure for new specification)

Item No	Item	Specification		Reference Annexure
10	Power analyzer	Other	Accessories such as voltage and current transformers, clamp on current probes and test leads should be provided for Three input measurements	Annexure 01
			Power analyzer should be a portable one	

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Annexure 01 - Technical Specifications

Supply, Delivery, Installation & Commissioning of Laboratory Equipment for Department of Engineering Technology, Faculty of Technological Studies - UWU/AHEAD/18/TS/ET/02

No	Item	Feature	Specifications	Bidders' Response
1	Handheld Analog multi meter	Measuring Range	100mV-600V DC, 7 steps	
			10V-600V, 5 steps	
			50µA – 1A DC, 5 steps	
			3mA-3A AC, 4 steps	
			Ω x 1/10/100 resistance	
		Internal Resistance	20kΩ/V (DC) /6.67kΩ/V (AC)	
		Scale Zero Point	left	
		Other	Electrical supply voltage 1x 1.5V battery	
			Relevant test leads and other applicable accessories should be provided	
		Operating Environment	Laboratory	
		Operating Temperature Range	+150C to 400C	
		User Guide	Manual in printed or electronic form should be provided	
		Warranty Period	5 years or more	
		Manufacturer	Should be ISO9001 certified	
		Other Comments	Above specification should have marked in the manufacturer's original catalogue	
			The bidder shall have supplied similar laboratory equipment's during last five years	
			The bidder should have submitted past experience in supplying similar laboratory equipment's	
2	Handheld Digital multi meter	General	This instrument should be hand held and portable	
			This instrument should be industrial type	
			This instrument should show true RMS value	
			Should have Low impedance to detect stray voltage	
			Should have low pass filter for variable frequency drive measurements	
			Audible continuity	
			Diode test should available	
			Should give warning against improper test leads connection	
			Auto and manual ranging should available	
			Auto power off	
			Data hold and relative reading should be available	
		Measurements	AC and DC voltage (0-1000V)	

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			AC and DC current (0-10A)	
			Resistance (up to 60MΩ)	
			Diode test	
			continuity	
			Battery test	
			capacitance	
			Frequency	
			Duty cycle	
			One or more Temperature inputs	
		Safety Rated	CATIV for 600V , CATIII for 1000V	
		Operating Environment	Laboratory	
		Operating Temperature Range	$+15^0$C to 40^0C	
		Required Net Dimension of the Apparatus	100mmx50mmx25mm or closest	
		User Guide	Manual in printed or electronic form should be provided	
		Warranty Period	5 years or more	
		Manufacturer	Should be ISO9001 certified	
		Other Comments	Above specification should have marked in the manufacturer's original catalogue	
			The bidder shall have supplied similar laboratory equipment's during last five years	
			The bidder should have submitted past experience in supplying similar laboratory equipment's	
3	Heavy Duty Ammeter	General	Specially designed for student experiments	
			Instrument should have three or more current ranges	
			There should be a switch selectable by input jack to measure AC or DC values	
		Ranges (AC and DC)	O to 50mA/500mA/5A	
		Accuracy	+or- 2%	
		Voltage Drop	Max. voltage drop 0.25V or less	
		Frequency Response	50Hz to 20kHz	
		Overload Protection	15A	
		Other	This instruments should be designed for student experiments in the laboratory	
			Relevant test leads and other applicable accessories should be provided	
		Operating Environment	Laboratory	
		Operating Temperature Range	$+15^0$C to 40^0C	
		Required Net Dimension of the Apparatus	150mmx120mmx50mm or closest	

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		User Guide	Manual in printed or electronic form should be provided	
		Warranty Period	5 years or more	
		Manufacturer	Should be ISO9001 certified	
		Other Comments	Above specification should have marked in the manufacturer's original catalogue	
			The bidder shall have supplied similar laboratory equipment's during last five years	
			The bidder should have submitted past experience in supplying similar laboratory equipment's	
4	Heavy Duty Voltmeter	General	Specially designed for student experiments	
			Instrument should have three or more voltage ranges	
			There should be a switch selectable by input jack to measure AC or DC values	
		Ranges (AC and DC)	0 - 3 V,15V,30 V	
		Accuracy	+or- 2% of full scale	
		Sensitivity	10kΩ per V	
		Frequency Response	20Hz -50kHz	
		Other	This instruments should be designed for student experiments in the laboratory	
			Relevant test leads and other applicable accessories should be provided	
		Operating Environment	Laboratory	
		Operating Temperature Range	$+15^0$C to 40^0C	
		Required Net Dimension of the Apparatus	150mmx120mmx100mm or closest	
		User Guide	Manual in printed or electronic form should be provided	
		Warranty Period	5 years or more	
		Manufacturer	Should be ISO9001 certified	
		Other Comments	Above specification should have marked in the manufacturer's original catalogue	
			The bidder shall have supplied similar laboratory equipment's during last five years	
			The bidder should have submitted past experience in supplying similar laboratory equipment's	

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5	Single phase and three phase AC/DC Watt meter	Measuring Range	50Hz frequency	
			60V to 480V AC/DC	
			5A current range	
		Input Resistance	30kΩ -480kΩ	
		Zero Point	left	
		Frequency Response	0Hz to 500Hz	
		Accuracy	+or- 1% for single phase AC	
			+or- 2% for balanced three phase AC	
			+or- 2.5% for DC	
		Protection	6.3A HRC fuse	
		Other	This instruments should be designed for student experiments in the laboratory	
			Relevant test leads and other applicable accessories should be provided	
		Operating Environment	Laboratory	
		Electrical Supply Compatibility	230V/50Hz	
		Operating Temperature Range	$+15^0$C to 40^0C	
		Required Net Dimension of the Apparatus	150mmx120mmx100mm or closest	
		User Guide	Manual in printed or electronic form should be provided	
		Warranty Period	5 years or more	
		Manufacturer	Should be ISO9001 certified	
		Other Comments	Above specification should have marked in the manufacturer's original catalogue	
			The bidder shall have supplied similar laboratory equipment's during last five years	
			The bidder should have submitted past experience in supplying similar laboratory equipment's	
6	Analog Oscilloscope	Bandwidth	30MHz or more	
		Number of Channels	Two channels should be available	
		Cursor Readout	Cursor read out should be available	
		Vertical Sensitivity	1mV/div	
		Horizontal Axis	Sweep time should be 0.2μs -0.5s/div	
			Sweep magnification 10 times	
		XY Mode	XY mode should be available	

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		Auto Time Base Settings	Auto time base settings should be available	
		Buzzer Alarm	Buzzer alarm should be available	
		Display	LCD readout display for vertical/horizontal/Frequency measurements	
		External Triggering Signal Input	Input impedance should be approximately 1MΩ,25pFand maximum input voltage should be 300v DC and AC peak	
		Frequency Counter	Frequency counter should be available within the oscilloscope	
		Other	This should have high performance and should be reliable	
		Operating Environment	Laboratory	
		Electrical Supply Compatibility	230V/50Hz	
		Operating Temperature Range	$+15^0$C to 40^0C	
		Required net Dimension of the Fluid Friction Apparatus	360mmx180mmx120mm or closest	
		User Guide	Manual in printed or electronic form should be provided	
		Warranty Period	5 years or more	
		Manufacturer	Should be ISO9001 certified	
		Other Comments	Above specification should have marked in the manufacturer's original catalogue	
			The bidder shall have supplied similar laboratory equipment's during last five years	
			The bidder should have submitted past experience in supplying similar laboratory equipment's	
7	Digital Storage Oscilloscope	Digital Storage Oscilloscope	Equipment should be dual channel (two input channels should be available)	
			Equipment should have Frequency range of 30MHz or more	
			Equipment should have Input impedance of 1MΩ,15pF,maximum 400 VDC	
			Vertical axis range should be 2mV -10V/Skt and rise time should be less than 14ns	
			Horizontal axis should be 5ns to 100s /Div	

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				Memory depth per channel 4k points or more	
				Go/No Go function should be available	
				Auto, norm and single trigger mode should be available	
				Add,subtract,FFT math functions should be available	
				USB,VGA and LAN ports should be available	
				Equipment should have LCD display	
				Equipment should designed to meet today's most demanding engineering requirements and budget	
				Equipment should be user friendly, economic design and compact	
			Probe	Two probes should provide per each oscilloscope which are applicable with above digital oscilloscope	
				Input resistance should be 1MΩ and 10MΩ (at 10MΩ Oscilloscope input)	
				Bandwidth should be 100Mz	
				Input voltage should be 600VDC including AC peak	
				Connection should be BNC plug	
				This should include channel identifier clip, sprung hook, ground lead, insulating tip, IC tip, adjusting tool, measuring tip, and sprung earth tip	
			Operating Environment	Laboratory	
			Electrical Supply Compatibility	230V/50Hz	
			Operating Temperature Range	$+15^0$C to 40^0C	

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		Required net Dimension of the Fluid Friction Apparatus	360mmx180mmx120mm or closest	
		User Guide	Manual in printed or electronic form should be provided	
		Warranty Period	5 years or more	
		Manufacturer	Should be ISO9001 certified	
		Other Comments	Above specification should have marked in the manufacturer's original catalogue	
			The bidder shall have supplied similar laboratory equipment's during last five years	
			The bidder should have submitted past experience in supplying similar laboratory equipment's	
8	DC power supply	Output	Isolated two channels should be available	
			Voltage range should be 0-30V	
			Current range should be 0-3A	
			Max output less than 200W	
			ON/OFF switch should be available	
		Regulation	Approximate 0.01% line regulation should be provide	
		Weight	Less than 5kg	
		Protection	Overload protection should be provide	
		Display	LED or LCD screen	
			Digital panel control	
		Operation	Series or parallel operation available	
		Design	Design should be compact, user friendly, coarse and fine volume control	
		Other	Smart cooling fan should be available to achieve low noise	
			USB standard interface for data transfer should be available	
		Operating Environment	Laboratory	
		Electrical Supply Compatibility	230V/50Hz	
		Operating Temperature Range	$+15^0$C to 40^0C	

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		Required Net Dimension	210mmx130mmx265mm or closest	
		User Guide	Manual in printed or electronic form should be provided	
		Warranty Period	5 years or more	
		Manufacturer	Should be ISO9001 certified	
		Other Comments	Above specification should have marked in the manufacturer's original catalogue	
			The bidder shall have supplied similar laboratory equipment's during last five years	
			The bidder should have submitted past experience in supplying similar laboratory equipment's	
9	Function Generator	Waveforms	This instrument should be generate sine, square, ramp, noise and arbitrary waveform	
		Arbitrary Function	20MSa/s sample rate	
			10MHz repetition rate	
			4k point waveform length	
			10 bit amplitude resolution	
		Frequency Characteristics	0.1Hz-25MHz range for sine /square	
			0.1Hz-1MHz range for ramp	
			0.1Hz resolution	
		Modulation	AM/FM/FSK modulation should available	
		Square Waveform	1% - 99% adjustable Duty cycle for Square waveform	
		Display	LCD screen which displaying Amplitude ,DC offset and other key setting information simultaneously	
		Other	Waveform parameter setting can be done through Numeric keypad entry and knob selection	
			USB device interface for remote control and waveform editing	
		Operating Environment	Laboratory	
		Electrical Supply Compatibility	230V/50Hz	
		Operating Temperature Range	$+15^0$C to 40^0C	
		Required net Dimension Apparatus	300mmx120mmx120mm or closest	
		User Guide	Manual in printed or electronic form should be provided	
		Warranty Period	5 years or more	

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		Manufacturer	Should be ISO9001 certified	
		Other Comments	Above specification should have marked in the manufacturer's original catalogue	
			The bidder shall have supplied similar laboratory equipment's during last five years	
			The bidder should have submitted past experience in supplying similar laboratory equipment's	
10	Power analyzer	Measuring Parameters	Voltage ,current, active power, reactive power, apparent power, power factor, phase angle ,peak voltage, peak current, crest factor, harmonic measurements, THD calculation ,vector representation	
		Range	Voltage up to 1000V	
			Current up to 40A	
		Inputs	Model should be support for Three input element	
		Other	USB/RS232 communication interface should be available	
			Accessories such as voltage and current transformers, clamp on current probes and test leads should be provided Three input measurements	
			Power analyzer should be a portable one	
		Operating Environment	Laboratory	
		Electrical Supply Compatibility	230V/50Hz	
		Operating Temperature Range	$+15^0$C to 40^0C	
		Required net Dimension of the Apparatus	300mm x150mmx 150mm or closest	
		User Guide	Manual in printed or electronic form should be provided	
		Warranty Period	5 years or more	
		Manufacturer	Should be ISO9001 certified	
		Other Comments	Above specification should have marked in the manufacturer's original catalogue	
			The bidder shall have supplied similar laboratory equipment's during last five years	
			The bidder should have submitted past experience in supplying similar laboratory equipment's	

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11	Single phase and three phase transformer trainer	General	This apparatus should be able to deal with practical regarding isolation transformers and auto transformers, design and connection of transformers, equivalent circuit diagrams, transformer ratios, no load and short circuit experiments and vector groups used in three phase transformers.
		Power	This training system should be based on a transformer with a approximate power level of 100VA
		RLC Load	This apparatus should provide relevant ohmic, inductive and resistive loads for experiments
		Measuring Units	Relevant measuring instruments such as multi meter, wattmeter, power factor meter should be comes with the training unit
		Accessories	Set of safety measurement cables, safety connecting plugs should be provided
		Operating Environment	Laboratory
		Electrical Supply Compatibility	3x230V/400V/50Hz
		Operating Temperature Range	$+15^0$C to 40^0C
		Required net Dimension of the Apparatus	1800mmx120mmx40mm or closest
		User Guide	Manual in printed or electronic form should be provided
		Warranty Period	5 years or more
		Manufacturer	Should be ISO9001 certified
		Other Comments	Above specification should have marked in the manufacturer's original catalogue
			The bidder shall have supplied similar laboratory equipment's during last five years
			The bidder should have submitted past experience in supplying similar laboratory equipment's
12	AC and DC Electrical machine trainer	General	The apparatus should allow students to learn both industrial AC and DC electrical machines.
			The apparatus should be versatile but should be cost effective.
			The apparatus should be include conventional parts than virtual instruments
			The apparatus should have fully delivered torque/speed measurement system

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			The apparatus should allow fast and easy machine coupling	
			Nominal power should be less than 1kW for supplied each motor	
			The apparatus should maintain high electrical and mechanical safety	
		Major Parts	The apparatus should have DC motors and Generators including DC shunt motor, DC series motor, DC compound motor, DC separately excited motor, DC shunt Generator, , DC compound Generator, DC separately excited Generator	
			The apparatus should have a Single phase induction motor	
			The apparatus should have a Three phase induction motor	
			The apparatus should have a control panel with measuring instruments	
			The apparatus should provide relevant size of load resistors, load reactors and load capacitors for experiments.	
		Operating Environment	Laboratory	
		Electrical Supply Compatibility	230V/50Hz	
		Operating Temperature Range	$+15^0$C to 40^0C	
		Required Net Dimension for the Electrical Machine Trainer Panel	1600mm L x600 mm D X 1600mm H or closest	
		User Guide	Manual in printed or electronic form should be provided and also laboratory experiment guidance for each practical session should be provided.	
		Warranty Period	5 years or more	
		Manufacturer	Should be ISO9001 certified	
		Other Comments	Above specification should have marked in the manufacturer's original catalogue	
			The bidder shall have supplied similar laboratory equipment's during last five years	
			The bidder should have submitted past experience in supplying similar laboratory equipment's	
13	Refrigeration cycle trainer kit		Should be able to take Pressure and temperature measurements taken around the	

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			refrigeration circuit	
			Software allows students to visualize experimental parameters using Pressure – Enthaply charts	
			Temperature sensors in heat source and heat sink water tanks allows clear demonstration of a refrigeration or heat pump cycle	
			Water pump allows circulation of water for steady-state experiment	
			Refrigerant circuit colour-coded to international standard	
			Should be able to demonstrate and determine and investigate Basic refrigeration cycle energy balance	
			Should be able to determine and investigate the COP of refrigeration cycle	
			Should be able to determine and investigate non-isentropic, isentropic and volumetric efficiencies of the compression stage	
			Should be able to compare performance between actual and reversed Carnot cycles.	
		Operating Environment	Laboratory	
		Dimensions of the refrigeration cycle trainer kit	700 mm wide x 400 mm front to back x 700 mm high or closest	
		Operating temperature range	0°C to +30°C or similar	
		LCD display	Yes. For all measured parameters	
		Electrical Supply compatibility	230 V / 50 Hz (Phase voltage)	
		Data acquision	Yes. For all measured and important parameters	
		Connectivity	Connectivity included featuring data acquisition via USB	
		Software	Yes. For data acquision and processing. Should be compatible with windows 7 or newer versions	
		Warranty	5 years or more	
		Manufacturer	Should be ISO9001 certified	
		Other comments	Above related specification should have marked in the manufacturer's original catalogue The bidder shall have supplied similar laboratory equipment's during last five years The bidder should have submitted past experience in supplying similar laboratory equipment Delivery, supply and Installation must be done by the supplier Training session related to the instrument should provided by the supplier	

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14	Air conditioning trainer kit		Should be able to take Pressure and temperature measurements taken around the refrigeration circuit	
			Should be able to measure Relative humidity and temperature upstream and downstream of the evaporator	
			Should be able to use to Learn to use Psychrometric charts	
			Should be able to Determine enthalpy change in the air flow	
			Should be able to Learn to use a Pressure-Enthalpy chart	
			Should be able to Determine Coefficient of Performance (COP)	
		LCD display	Yes. For all measured parameters	
		Dimensions of the air conditioning trainer kit	900 mm wide x 500 mm front to back x 800 mm high or closest	
		Operating Environment	Operating Environment	
		Operating temperature range	0°C to +30°C or closest	
		Electrical Supply compatibility	230 V / 50 Hz (Phase voltage)	
		Data acquision	Yes. For all measured and important parameters	
		Connectivity	Connectivity included featuring data acquisition via USB	
		Software	Yes. For data acquision and processing. Should be compatible with windows 7 or newer versions	
		Manufacturer	Should be ISO9001 certified	
		Warranty	5 Years or more	
		Other comments	Above related specification should have marked in the manufacturer's original catalogue The bidder shall have supplied similar laboratory equipment's during last five years The bidder should have submitted past experience in supplying similar laboratory equipment Delivery, supply and Installation must be done by the supplier Training session related to the instrument should provided by the supplier	

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15	Laboratory scale steam power plant		Should be able to gain insight into the first and second laws of thermodynamics
			Should be able to measure Relative humidity and temperature upstream and downstream of the evaporator
			Should be able to use to Learn to use Psychrometric charts
			Should be able to Determine enthalpy change in the air flow
			Should be able to Learn to use a Pressure-Enthalpy chart
			Should be able to Determine Coefficient of Performance (COP)
		LCD display	Yes. For all measured parameters
		Dimensions of the air conditioning trainer kit	900 mm wide x 500 mm front to back x 800 mm high or closest
		Operating Environment	Operating Environment
		Operating temperature range	0°C to +30°C or closest
		Electrical Supply compatibility	230 V / 50 Hz (Phase voltage)
		Data acquision	Yes. For all measured and important parameters
		Connectivity	Connectivity included featuring data acquisition via USB
		Software	Yes. For data acquision and processing. Should be compatible with windows 7 or newer versions
		Manufacturer	Should be ISO9001 certified
		Warranty	5 Years or more
		Other comments	Above related specification should have marked in the manufacturer's original catalogue The bidder shall have supplied similar laboratory equipment's during last five years The bidder should have submitted past experience in supplying similar laboratory equipment Delivery, supply and Installation must be done by the supplier Training session related to the instrument should provided by the supplier

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