

TENDER DOCUMENT

FOR

**Supply and Installation of EQUIPMENT (AICTE/IDC/MOD-NER/POLICY-1-
Instrumentation Engineering)**

At

JORHAT ENGINEERING COLLEGE

BID REFERENCE NO:

Ref. JEC/AICTE/IDC/MOD-NER/POLICY-1-INSTR/PROCUREMENT/2022 Tender-1, Dated
02/06/2022

UNDER

AICTE MODROB SCHEME FOR NORTH EAST REGION (AICTE/IDC/MOD-NER)

(AICTE/IDC/MOD-NER)



JORHAT ENGINEERING COLLEGE

Jorhat - 785007, Assam, India

**Tender for Supply and Installation of EQUIPMENT (AICTE/IDC/MOD-NER/POLICY-1-
Instrumentation Engineering)**

BID REFERENCE:	Ref. JEC/AICTE/IDC/MOD-NER/POLICY-1- INSTR/PROCUREMENT/2022 Tender-1, Dated 02/06/2022
DATE OF ADVERTISEMENT:	DATE 02/06/2022
LAST DATE AND TIME FOR RECEIPT OF BIDS:	DATE 23/06/2022 TIME: 12:00 AM
TIME AND DATE OF OPENING OF BIDS:	Technical Bids: DATE 24.06.2022 TIME: 11:00 AM Financial Bids: Price bid will be opened for the bids those technically qualified.
PLACE OF OPENING OF BIDS:	JORHAT ENGINEERING COLLEGE JORHAT-785007 ASSAM
ADDRESS FOR COMMUNICATION:	THE PRINCIPAL JORHAT ENGINEERING COLLEGE JORHAT-785007 ASSAM

Check list

Documents		Check
DD of Rs 500/- (non-refundable processing fees)	Technical Bid	
EMD @ 2% of the financial bid	Technical Bid	
Bio-data (Annexure A)	Technical Bid	
Undertaking (self- certificate) of no outstanding bankruptcy, judgment or pending legal action (Annexure B)	Technical Bid	
Copies of the credentials/ self-certificate (Annexure C)	Technical Bid	
Schedule of requirement (Annexure D)	Technical Bid	
Complete technical specifications and pamphlets	Technical Bid	
OEM's authorization letter (Annexure E)	Technical Bid	

Photocopy of PAN card	Technical Bid	
Photocopy of GST	Technical Bid	
Financial Proposal (Annexure F)	Financial Bid	

SUPPLY OF EQUIPMENT (AICTE/IDC/MOD-NER/POLICY-1-Instrumentation Engineering)

INVITATION FOR BIDS (IFB)

Date : 02.06.2022

Ref. JEC/AICTE/IDC/MOD-NER/POLICY-1-INSTR/PROCUREMENT/2022

IFB No. : Tender-1, Dated 02.06.2022

- 1. The Principal, Jorhat Engineering College, Jorhat** invites sealed bids from eligible bidders for supply of **Equipment for AICTE-MODROB sponsored project- AICTE/IDC/MOD-NER/POLICY-1-Instrumentation Engineering Department** listed below: The detail specifications is given in Annexure-F

Sr. No	Item Name	Quantity	Place of Delivery	Installation Requirement (if any)
1	Advanced Sensor based control Setup	1	Instrumentation Engineering Department, Jorhat Engineering College	Yes
2	Complete Experimentation System for Speed Sensing & Analysis	1		Yes
3	Displacement Sensing Transducers	1		Yes
4	Embedded Hardware for Data Acquisition and Control Application	1		Yes
5	Flow measurement using Orifice	1		Yes
6	Level measurement using capacitive transducer	1		Yes
7	Light Sensing Transducers	1		Yes
8	Multifunctional Data Acquisition Device	1		Yes
9	SENSOR TRAINER KIT Unit	1		Yes

	with Computer Interface and Compatible computer System.			
10	Sensor and Transducer with Motors and Actuator Package	1		Yes
11	Strain gauge Transducers	1		Yes
12	Temperature Sensing Trainer kit with LabVIEW based analysis feature.	1		Yes

Name of the Work	Bid Security	Cost of the Bid/Tender Document (Non-refundable)	Period of Completion
SUPPLY OF EQUIPMENT FOR AICTE-MODROB sponsored project-AICTE/IDC/MOD-NER/POLICY-1-Instrumentation Engineering Department	@ 2% of the financial offer	500.00	30 days

Tender Notice:

Sealed Tenders are invited directly from Suppliers/Manufacturers/Authorised dealers for Supply, Installation, Testing and Commissioning **SUPPLY OF EQUIPMENT FOR AICTE/IDC/MOD-NER/POLICY-1-Instrumentation Engineering Department** at Jorhat Engineering College, Jorhat. The last date of submission of tender document is on or before 23/06/2022 at 12:00 AM. The detailed tender document can be downloaded from the website <http://www.jecassam.ac.in>

1. The entire supply and installation must be completed within **30 days** from the date of issue of Purchase Order.
2. Any prospective bidder can procure the Tender Document from the website <http://www.jecassam.in>. A fee of Rs 500/- (by demand draft) in favour of “Principal, Jorhat Engineering College” payable at Jorhat has to be paid by demand draft at the time of submitting the tender by enclosing it in the technical bid.
3. Notwithstanding anything else contained to the contrary in this Tender Document, Principal, Jorhat Engineering College, Jorhat reserves the right to cancel/withdraw/ modify fully or partially the tender or to reject one or more of the bids without assigning any reason and shall bear no liability whatsoever consequent upon such a decision.

Date: 02/06/2022

Principal
Jorhat Engineering College

A. Source of Funds

MODROB scheme, one of the AICTE Quality Improvement Scheme (AQIS), intends to support development of laboratories with appropriate equipment/ technology/ tools/ software and encourages financial contribution from industry. This is to ensure that the practical work and project work to be carried out by students is contemporary and suits the needs of the industry. The funds under this Scheme could ideally be used to create technical infrastructure for revised curriculum for up-gradation of equipment in existing laboratories, enhancement of performance of existing equipment, or replacement of depreciated equipment by the modern equipment. The limit of funding is Rs 13 Lakh for project duration of 2 years.

B. General instructions for submission of bids/tenders:

- 1) Interested firms/ Company/ Agencies may submit tender in single bid system to the Principal, Jorhat Engineering College, Jorhat-785007, Assam along with non-refundable processing fee of Rs. 500/- (Rupees Five hundred) only in the form of Bank Draft from any nationalized Bank payable to the Principal, Jorhat Engineering College at Jorhat on or before 23/06/2022 (before 12:00 AM). The bid will be opened on 24th **June 2022** at 11.00 AM in presence of intended bidders. In case of changing of date regarding opening of tender, this will be notified in the JEC website www.jecassam.ac.in only. In the interest of the bidders, they are requested to provide contact phone no. on the cover of the main sealed envelope to facilitate ease communication.
- 2) The bidder should be a manufacturer who must have manufactured, tested and supplied the equipment(s) similar to the type specified in the “schedule of requirements” (Annexure D) up to at least 80% of the quantity required in any one of the last 3 years, namely, 2018-19 to 2021-22. The equipment offered for supply must be of the most recent series models incorporating the latest improvements in design. Further, bidder should be in continuous business of manufacturing products similar to that specified in the schedule of requirements during the last three years prior to bid opening.
- 3) Bids of bidders quoting as authorized representative of equipment manufacturer, meeting with the above requirement in full, can also be considered provided.
 - i. The manufacturer furnishes authorization in the prescribed format Annexure-E assuring full guarantee and warranty obligations as per conditions of contract; and
 - ii. The bidder, as authorized representative, has supplied, installed and commissioned satisfactorily at least 30% of the quantity similar to the type specified in the Schedule of Requirements in any one of the last three years, namely, 2018-19 to 2021-22 which must be in satisfactory operation for at least 6 months on the date of bid opening and must be providing annual maintenance services for the above equipment in the country for over one year. The bidder should furnish the information of past three years supplies and satisfactory performance, in proforma under Annexure C.
- 4) Suite or any legal proceedings in regard to this matter arising in any respect under this contract shall be instituted in any court in Jorhat, Assam only.
- 5) The bid must be submitted in a sealed envelope and should be superscripted as

F. No. 9-17/IDC/MOD-NER/POLICY-1/2021-22:: **Tender for Supply of Lab Equipment for AICTE/IDC/MOD-NER/POLICY-1-Instrumentation Engineering Department**

Ref. JEC/AICTE/IDC/MOD-NER/POLICY-1/INSTR/PROCUREMENT/ 2022 Tender-1,
Dated 02/06/2022

- 6) The Earnest Money Deposit (**EMD**) @ **2%** in the form of Demand Draft Drawn in favour of “Principal, Jorhat Engineering College” payable at Jorhat or Bank Guarantee from any of the commercial banks in an acceptable form safeguarding Jorhat Engineering College interest only is to be submitted along with bid.
- 7) The bidder must bear all cost associated with the preparation & submission of its Bid and the Jorhat Engineering College in no case be responsible or liable for those costs, regardless of the conduct of the outcome of the tendering process.
- 8) The bid will not be returned to the bidder after selection.
- 9) Submission of bid in respect to this bid can't be construed as obligation on the part of the Jorhat Engineering College towards a purchase.
- 10) Blank column and overwriting is not permitted in the filled up bids.
- 11) Bid terms and condition must be clearly written/ typed and have full name & address of the bidder. Each and every page shall have the signature & seal of the Authorized respectively.
- 12) The entire work is of a time bound nature and the firm/ company will have to execute the work as per schedule given by the Jorhat Engineering College.
- 13) Payment norms shall be followed. Request for advance payment shall not be entertained in any case. Payment shall be released after satisfactory completion of work duly certified by the competent authority.
- 14) A copy of self-attested GST Registration No., PAN card with a self-attested certificate that the firm / company never been black listed must be attached with the Bid.
- 15) **Rated quoted must be inclusive of all applicable taxes and other charges.**
- 16) The equipment has to be installed and commissioned by supplier at our site and all features of the system are to be demonstrated through operation by the supplier at our site
- 17) **Bidder should participate for the entire work.**
- 18) **Jorhat Engineering College reserves the right to allot the entire work or part thereof.**
- 19) Jorhat Engineering College reserves the right to reject any particulars or all bids without assigning any reasons whatsoever to anyone and failure of the Jorhat Engineering College to select the bidder shall not result in any claim whatsoever against the Jorhat Engineering College.
- 20) Any clarification/doubt may be addressed to Coordinator, IDC/MOD-NER/Policy-1/2021-22 Jorhat Engineering College. (Mr Arobindra Saikia , E-mail: arvind_saikia@yahoo.com, mobile: 8638500062)
- 21) Performance Security
 - a. **The EMD supplied with the tender document as Bid Security will be considered as Performance Security for the successful supplier.**
 - b. The Performance Security will be discharged by the Purchaser and returned to the Supplier after the warranty period.

The bid security/ Performance Security may be forfeited:

- (a) if a Bidder withdraws its bid during the period of bid validity specified by the Bidder on the Bid Form;
- (b) in case of a successful Bidder, if the Bidder fails to sign the Contract in time

Date: 02/06/2022

Principal
Jorhat Engineering College

Bio-data: Annexure - A

The bidder is required to submit the following information:

1. Name of the firm:
2. Name of the Proprietor /Partner/Managing Director etc.
3. Year of Establishment:
4. Postal address:
5. Telephone Numbers
6. E-Mail
7. Details of products you are dealing in :
8. List of Existing Clients
9. Has your firm ever been black listed by the Govt. or any other authority? Please give details and reasons thereof.

10. Are you income tax payee, if so please furnish following details
a) PAN
b) GST Registration No.
11. EMD Details:
12. DD (non-refundable processing fees) details:

Note: There should not be any indication of price/rate/charges in Technical Bid of the tender. Conditional tenders will not be accepted.

Declaration:

I/ we do hereby declare that the entries made in the application are true to the best of my /our knowledge and belief. I /we do also confirm that I / we have read and understood the General Conditions of Contract and agree to abide by the same in all respect.

I /we also undertake to communicate promptly to Jorhat Engineering College all the subsequent changes in conditions affecting the accuracy of the details given above.

Signature of Proprietor/ Director/ Managing Director

Annexure–B

Declaration regarding black-listing and/ or litigations

I/we hereby declare that our firm/agency is not black-listed/ banned by any Ministry or Department of Central Government/State Government or PSU or other bodies under the Central Government/ State Government. I/we further declare that no criminal case is registered or pending against the firm/company or its owner/partners/directors anywhere in India.

Date the day of 2022

Signature of Bidder_____

Name & Address of Bidder _____

Seal of the Firm/Company

Date:

Annexure –C

Details of the similar type of works completed by the Bidder (Attached Work order copy)

Name of the Bidder:

Year	Name and type of works completed	Name and address of the buyer/ customer	Value of the works	Remarks

Signature & Date of the Authorized Signatory with Official Seal

Schedule of requirement: Annexure D

Sr.No.	Item Description	Delivery Period
1.		30 Days

Annexure - E

MANUFACTURERS' AUTHORIZATION FORM*

No. _____ dated

To

Dear Sir:

Tender Ref:

We _____ who are established and reputable
manufacturers of

_____ (name and description of goods offered)

having factories at

_____ *ad*
dress of factory)

do hereby authorize M/s _____ *(Name and*
address of Agent)

to submit a bid, and sign the contract with you for the goods manufactured by us against the above tender Ref. No.

We hereby extend our full guarantee and warranty for the goods and services offered for supply by the above firm against this tender Ref. No.

Yours faithfully,

(Name)

(Name of manufacturers)

Note: This letter of authority should be on the letterhead of the manufacturer and should be signed by a person competent and having the power of attorney to legally bind the manufacturer. It should be included by the Bidder in its bid.

* Modify this format suitably in case where manufacturer's warranty and guarantee are not applicable for the items for which bids are invited.

Annexure - E

FORMAT FOR QUOTATION SUBMISSION
(In letterhead of the supplier with seal)

Date: _____

To
The Principal
Jorhat Engineering College
Jorhat-785007

Sl. No	Description of goods \ (with full Specifications	QTY	UNIT	Quoted Unit rate in Rs. (Including Ex-Factory price, excise duty, packing and forwarding, transportation, insurance, other local costs incidental to delivery and warranty/ guaranty commitments)	Total Price without taxes (A)	Sales tax and other taxes payable	
						%	In figures (B)
Total Cost							

Gross Total Cost (A+B): Rs. _____

We agree to supply the above goods in accordance with the technical specifications for a total contract price of Rs. _____ (Amount in figures) (Rupees _____ amount in words) within the period specified in the Invitation for Quotations.

We confirm that the normal commercial warranty/ guarantee of _____ months shall apply to the offered items and we also confirm to agree with terms and conditions as mentioned in the Invitation Letter.

We hereby certify that we have taken steps to ensure that no person acting for us or on our behalf will engage in bribery.

Signature of Supplier

Name: _____

Address: _____

Contact No. _____

Annexure-F

Sl. No	Item Name	Specification	Quantity
1	Advanced Sensor based control Setup	<p><u>Controller Section:</u></p> <ul style="list-style-type: none"> i. Connects to PC (P4/XP) parallel port through 25 pin M to F cable/1.5mtr. ii. 4 ADC channels I/P: 0 to 2.5V FS with 1 no input simulation pot. 1 DAC channel O/P 2.5V FS. iii. V to I function block: I/P 0 to 2.5V & O/P 0-20 or 4-20mA (100W load) switch settable iv. I to V function block : I/P 4 to 20mA & O/P 0-2.5V v. USB converter to interface 25 pin D connector on CIP panel to USB using PIC18F microcontroller 28 Pin SOIC enclosed in 25 Pin D shell using Type A to mini B cable. vi. Hardware module of square root extractor is provided so that PLC/Panel mount PID may be interfaced. <p><u>Instrumentation Power supply cum Multichannel DPM panel:</u></p> <ul style="list-style-type: none"> i. $\pm 12V/500$ mA, +5V/300mA, Unregulated 17V dc/750 mA, line synchronizing signal. ii. Multi-channel DPM for digital display of process parameters. iii. 20 pin FRC power bus to supply power to neighbouring panels. <p><u>Thyristor Actuator cum signal conditioning panel:</u></p> <ul style="list-style-type: none"> i. Thyristor bridge based 0-200V/3A using cosine firing circuit, I/P 0 to 2.5Vdc. ii. Supports signal conditioning for RTD, Pressure 	

		<p>sensor with Instrumentation Amplifier & flow sensor (water/air) with F to V converter to generate 0-2.5Vdc (FS).</p> <p>iii. Facilitates closed loop control experiments based on temperature, light intensity, speed measurement using built in P/PI controller as well as external Analog/Digital PID controller.</p> <p>iv. 2No. panels may be needed to cover signal conditioning needs of the selected process.</p> <p>PC (WIN7/8/10) based digital PID controller:</p> <ul style="list-style-type: none"> • Online monitoring / Data acquisition / PID Software on Installable (CD) work under XP, WIN7. PC with parallel port / USB needed. <p>Operating Modes:</p> <p>Simulator Mode: Tests data stored in files (*.txt) Draw graph for all P, PI, PD & PID modes.</p> <p>b) Process Monitoring Mode: Draw graphs of analog data presented at CH 0 & CH 1 of CIP Cursors for X & Y axis for measurement & online graphs saving for reproduction.</p> <ul style="list-style-type: none"> ➤ c) PID controller Mode: ➤ PID controller with parameter like Integral Time Ti (0.01-64000), Sampling Time Ts (0.1-99.9), Derivative Time Td (0-99.9), Proportional Band Pb(1-999), Derivative Gain Kd(1-999), Set Value Rn (0-99.9), PID output Upper Limit Uh(0-99.9), PID output Lower Limit Ul (0-99.9). ➤ Facility to set units for output viz. (%) oC, RPM, V, mm, LPH, kg/cm², msi/cm, Degree. Experiments with advance process control scheme viz; Ratio, Cascade, feed forward with Aux PID, Ratio station & FF transfer function calculator, Alarm setting, ON/OFF control, square root extractor for Orifice. ➤ Function Generator: Sine/Triangular/Square wave generator with frequency 0.01 Hz to 1Hz, Amplitude is 0 to 2.5 V i.e. 0-100%. <p>Technical Specifications:</p> <p>Advance control Expt.:</p> <ul style="list-style-type: none"> •Parameters: Pressure/Temp/Flow Model • Controlled Medium: Air for pressure/Flow, Water for temp. & air (air bubbler) for Cooling <ul style="list-style-type: none"> • Storage tank material/Capacity: 1No., 10 litre plexiglass tank for water • Process tank capacity/material: 1 No. 5 litre, stainless steel tank with temp, pressure sensors attachment. Pressure relief valve (10 Bar) • Electronic sensor Type/Output/ Range: Pressure: piezo-resistive pressure sensor 0 to 30 PSI, O/P = 0 to 2.5V •Temp: PT 100, O/P= 0 to 2.5V, ambient to 1000C • Flow: Turbine flow sensor 1No. OP=0 to 2.5V, 0- 	
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		<p>150 LPM</p> <ul style="list-style-type: none"> • Control Valve : Pneumatically operated air to close, linear type, ½“ Size Diaphragm operated, C=0.4 with I to P Converter I/P 4 to 20mA O/P 4 to 20 mA O/P 3 to 15 psi. • TAP panel: SCR controlled full bridge (200Vdc) for 750 for temp. control I/P 0 to 2.5Vdc. • Rotameter: 2 Nos. Acrylic body ½“ size 0 to 50 LPM • Generation & Distribution Pump: 230VAC 10W submersible water pump with ¼” pvc pipe to fill in process vessel for temp. control expt. • Bourdon gauges: 2 Nos. 0 to 2 bars, 2Nos 0 to 10 bar 0-1000C gauge thermometer • Manual SS valves: ¼” size = 7Nos. • Piping material/size: Stainless steel, ¼” for air • Air filter and regulators OR accessories: 3 Nos, 0 to 10 bars size ¼” Oil catcher (1/4” size max. pressure=10bars)-1No. • Air compressor: 0 to 10 bars, 2HP, 230VAC supply Tank Capacity: 110 Ltrs. •Ratio: Between 2 water flows • Cascade: Inner (fast) loop flow. Outer loop temp. • Feed forward: Air Flow or temp loop. <p>The Setup should include a Computational device with i5 processor, 8 gb ram and 1 TB hard disk with display.</p>	
2	Complete Experimentation System for Speed Sensing & Analysis	<p>Master Unit Specifications:</p> <ol style="list-style-type: none"> i. Built in power supply: DC supply +/- 12V, 500mA, Variable 7V to 14V @ 3Amp. ii. Built in function generator: O/P waveform-sine, triangular & square, TTL O/P freq. 1Hz to 200 KHz in ranges with amplitude & freq. control; pots, o/p voltage 10Vpp. iii. On board measurement: DC voltmeter 2V/20V (1 No) & LED BAR graph with 10 LED indicator to display 0-2.5V or 0-4V input. iv. Master Unit Size: 460mm(W), 160mm (H), 350mm(D) <p>Experimental Panel Specifications:</p> <ol style="list-style-type: none"> i. 12V DC motor with speed varying from 0-4000 rpm & rotating slotted wheel having 8 slots ii. Individual signal conditioning circuit with programmable threshold comparator. iii. F to V Converter with span & zero amplifier iv. 6 Nos. of Speed transducers & their experiments: <ul style="list-style-type: none"> • Magnetic pickup, • Photo reflective • Photo interruptive 	1

		<ul style="list-style-type: none"> • Inductive pickup • Stroboscope envelop detector. • Hall sensor. 	
3	Displacement Sensing Transducers	<ol style="list-style-type: none"> i. Built in power supply: DC supply +/- 12V, 500mA, Variable 7V to 14V @ 3Amp. ii. Built in function generator: O/P waveform- sine, triangular & square, TTL O/P freq. 1Hz to 200 KHz in ranges with amplitude & freq. control; pots, o/p voltage 10Vpp. iii. On board measurement: DC voltmeter 2V/20V (1 No) & LED BAR graph with 10 LED indicator to display 0-2.5V or 0-4V input. iv. Desirable Master Unit Size: 460mm(W), 160mm (H), 350 mm (D) <p>Experimental Panel:</p> <ol style="list-style-type: none"> i. Micrometer 0-20mm (Accuracy 0.01mm) ii. Precision phase sensitive rectifier iii. Measurement frequency of 1KHz sine iv. Signal conditioning circuit with zero and span adjustment for calibration of variac sensor output voltage 0-2.5V or suitable for DPM. <p>Zero & span adjustment for calibration of following transducers:</p> <ol style="list-style-type: none"> i)Resistive linear transducer: 0-20mm ii)Capacitive linear transducer: 0-20mm iii)Capacitive angular transducer: 0-90 degree iv)Inductive linear transducer: 0-20mm v)LVDT transducer: 0-20mm or (-10 to +10 mm) 	1
4	Embedded Hardware for Data Acquisition and Control Application	<p>Kit should include:</p> <ol style="list-style-type: none"> i. Barrel connector with leads ii. Assorted capacitors iii. Diodes iv. 7-segment display v. Mechanical rotary encoder vi. Photo interrupter (light sensor with LED) vii. Assorted op-amps viii. Assorted LEDs ix. Small DC motor (1 VDC to 3 VDC, no load speed: 6600 rpm) x. Microphone with audio jack xi. MXP Breadboard (210-283): Breadboard expansion for the I/O device. xii. 1-pin MTE cables (240-005): 5-pack MTE cables xiii. Potentiometer (500 kΩ) xiv. Relay xv. Assorted resistors xvi. Piezoelectric sensor 	1

		<ul style="list-style-type: none"> xvii. Photocell xviii. 2 Hall effect sensors (latch and switch) xix. Buzzer xx. Assorted switches (DIP, slide and rotary) xxi. Thermistor (NTC: 10 kΩ, 25 degrees) xxii. Assorted transistors xxiii. Force sensing resistor xxiv. Wire kit <p>Mechatronics Accessory Kit should contain</p> <p>Common Sensors and Actuators for Mechatronics Projects that includes motors, sensors and components for teaching and implementing mechatronics concepts and also designed as an add-on to the Starter Kit.</p> <p>Kit should include:</p> <ul style="list-style-type: none"> i. Pmod ACL (410-097): 3-axis accelerometer ii. Pmod ALS (410-286): Ambient light sensor iii. Pmod CMPS2 (410-355): 3-axis compass iv. Pmod GYRO (410-215): 3-axis digital gyroscope v. Pmod HB5 (410-106): H-bridge driver with feedback inputs vi. Pmod MAXSONAR (240-071): Maxbotix ultrasonic range finder vii. Infrared proximity sensor (240-037): 10 cm to 80 cm viii. GWS Servo (290-010): S03TXF STD ix. GWS Servo (not sold separately): Continuous rotation S35 STD x. DC motor/gearbox 1:19 (290-006): Custom 12V motor designed for Digilent robot kits xi. Motor Adapter for NI myRIO (6002-410-011): Compatible with gear motors and servos. xii. Pmod Cable kit: 6", 6-pin Pmod cable xiii. Pmod Cable Kit: 6", 12-pin Pmod cable xiv. MTE Cable (250-061): 4-pin to 2x2-pin MTE cable xv. 6-pin Headers (240-004): 6-pin header and gender changer (5-pack) xvi. 2x6-pin Headers (240-062): 2x6-pin header (5-pack) <p>N.B. The Setup should include a Computational device with i7 processor, 8 gb ram and 1 TB hard disk with display.</p>	
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5	Flow measurement using Orifice	It should be compact, lightweight setup of size (190x700) consisting of orifice plate sensor (200LPH) ball valve to isolate, Rotameter (200LPH for orifice), U tube mercury manometer (70-0-70 mm of hg), 6 QRC's to measure differential pressure, flow measurement tank (5 Litre), submersibles water pump, sump water tank (15 litres).	1
6	Level measurement using capacitive transducer	It should consists of Acrylic level tank of 500mm, water pump, sump tank, manual valve mounted on compact light weight (530x 910 mm), Aluminium table top stand, complete with sensor conditioning, LCR meter & display Standalone system.	1
7	Light Sensing Transducers	<p>It should include 5 Nos. of Light sensors :</p> <ol style="list-style-type: none"> 1) Photo diode with I to V converter 2) Photo transistor with I to V converter 3) Photo resistor/LDR with R to V converter using constant current source. 4) Photovoltaic cell / Solar cell 5) Opto coupler, Laser diode, Infrared LED, Red LED 	1
8	Multifunctional Data Acquisition Device	<p>The device should include two differential analog input and analog output channels (200 kS/s, 16 bits, $\pm 10V$). The eight digital input and digital output lines (3.3V TTL-compatible) to interface both low voltage TTL (LVTTTL) and 5V TTL digital circuits. +5V, +15V, and -15V power supply outputs. The isolated 60V DMM can measure both AC and DC voltage and current as well as resistance, diode voltage and continuity. With Plug & Play software.</p> <p>N.B. The Setup includes a Computational device with i5 processor, 8 gb ram and 1 TB hard disk with display</p>	1
9	SENSOR TRAINER KIT Unit with Computer Interface and Compatible computer System.	<p>With compatible Computer System</p> <ul style="list-style-type: none"> ➤ Built in power supply : DC supply +/- 12V, 500mA, Variable 7V to 14V @ 3Amp. ➤ Built in function generator O/P waveform-sine, triangular & square, TTL O/P freq. 1Hz to 200KHz in ranges with amplitude & freq. control pots, o/p voltage 10Vpp. ➤ On board measurement 	1

		<p>DC voltmeter 2V/20V (1 No) & LED BAR graph with 10 LED indicator to display 0-2.5V or 0-4V input.</p> <p>➤ Computer interface Interfaces through 25 pin parallel port [LPT port]</p> <p>Optoisolated adaptor to prevent damage to PC parallel port (25 pin LPT) due to wrong connections. Interfaces through 25 pin M to F cable 1mtr Length. P4/XP not in scope of supply. Lab View based (optionally) executable to support virtual instrumentation with drivers supplied.</p> <p>4 ADC channels: 0 to 2.5V full scale</p> <p>1 DAC channel: o/p 2.5V/12V switch selectable full scale</p> <p>V to I Function block: Input: 0-2.5Vdc, Output: 0-20 or 4-20mA, upto max. 2Vdc GND compliance</p> <p>➤ V to PWM function block: I/P -0-2.5V, O/P-1KHz PWM O/P +9V.</p> <p>➤ USB IO module (HID class) to interface 25 pin D connector on CIA panel to USB PC port enclosed in 25 pin D shell using Type A to mini B cable.</p>	
10	Sensor and Transducer with Motors and Actuator Package	<p>The package should include:</p> <ul style="list-style-type: none"> ➤ LVDT Sensor with Signal Conditioning Circuit. ➤ Ultrasonic range finder ➤ Compass ➤ Servo motor: standard (215 degrees rotation) ➤ Servo motor: continuous rotation ➤ Accelerometer -3 axis, ➤ Motor Adapter for myRIO (compatible with gear motor and servos) ➤ Gyroscope -3 axis, ➤ Infrared proximity sensor (10 cm to 80 cm) ➤ Ambient light sensor (SPI) ➤ Assorted capacitors ➤ Diodes ➤ 7-segment display ➤ Mechanical rotary encoder ➤ Photo interrupter (light sensor with LED) ➤ Assorted op-amps ➤ Assorted LEDs ➤ Small DC motor ➤ Microphone with audio jack 	1

		<ul style="list-style-type: none"> ➤ MXP Breadboard Accessory ➤ Potentiometer (500 kΩ) ➤ Relay 2 channel and 4 channel ➤ Assorted resistors ➤ Piezoelectric sensor ➤ Photocell ➤ Hall effect sensors ➤ Buzzer ➤ Assorted switches ➤ Thermistor (NTC: 10 kΩ, 25 degrees) ➤ Assorted transistors ➤ Force sensing resistor ➤ Wire kit ➤ K type Thermocouple ➤ J Type Thermocouple ➤ Stepper motor ➤ Servo Motor (9g) ➤ Humidity Sensor (DHT-11) ➤ Pressure Sensor(barometric BMP180) ➤ Strain Gauge ➤ Soil Moisture sensor ➤ PIR Sensor ➤ Proximity Sensor ➤ Heartbeat Sensor ➤ Sound Detection Sensor ➤ Color Detection Sensor ➤ REES52 MQ2 Arduino Compatible Gas Sensor, Methane, Butane, LPG, Smoke Sensor ➤ IR Sensor Module (Obstacle Sensor) ➤ Hall Current Sensor Module (5A) 	
11	Strain gauge Transducers	<p>The package should include:</p> <ol style="list-style-type: none"> i. Piezo resistive transducer for strain measurement. ii. Micrometer 0-20mm (Accuracy 0.01mm) for strain generation. iii. Strain gauges mounted on cantilever in half & full Wheatstone bridge and instrumentation amplifier with Zero & span adjustment for calibration. <p>Experiments on Gauge factor determination, Strain indicator, Displacement measurement using Strain gauges.</p>	1
12	Temperature Sensing Trainer kit with LabVIEW based analysis feature.	<p>Master Unit Specifications:</p> <ol style="list-style-type: none"> i. Built in power supply: DC supply +/- 12V, 500mA, Variable 7V to 14V @ 3Amp. ii. Built in function generator: O/P waveform-sine, triangular & square, TTL 	1

		<p>O/P freq. 1Hz to 200KHz in ranges with amplitude & freq. control pots, o/p voltage 10Vpp.</p> <p>iii. On board measurement: DC voltmeter 2V/20V (1 No) & LED BAR graph with 10 LED indicator to display 0-2.5 V or 0-4 V input.</p> <p>Experimental Panel Specifications:</p> <ul style="list-style-type: none"> • Instrumentation Amplifier to amplify thermocouple signals • Built in heat bar/mini oven driven by Power Amplifier of sufficient wattage • Temp. selection upto 95 degree C in 5 ranges with ON / OFF closed loop control. <p>Different Temperature sensors :</p> <ol style="list-style-type: none"> i. Thermocouple J with room temp. calibration pot. ii. Thermocouple K with room temp. calibration pot. iii. Thermistor (100K), iv. RTD PT100, v. IC sensor (LM 34/35 or AD 220) vi. Bimetallic switch <p>Computer interface Module programmable with LabVIEW: It should include</p> <ol style="list-style-type: none"> i. DAQ USB Device with NI DAQmx Support, ii. DAQ consist of 08 Single ended or 04 Differential Analog Input Channel with 16 bit resolution and 50 kS/s sampling rate input ± 10 V, iii. 02 Analog Output channels with 16 Bit resolution 5 kS/s simulations per channel update rate in the range of ± 10 V, iv. 13 Digital Input/output line, v. A 32-bit Counter <p>Software: One Application Software to run the experiments in PC_BASED-Mode.</p> <p>N. B. The Setup should include a Computational device with i5 processor, 8 gb ram and 1 TB hard disk with display.</p>	
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